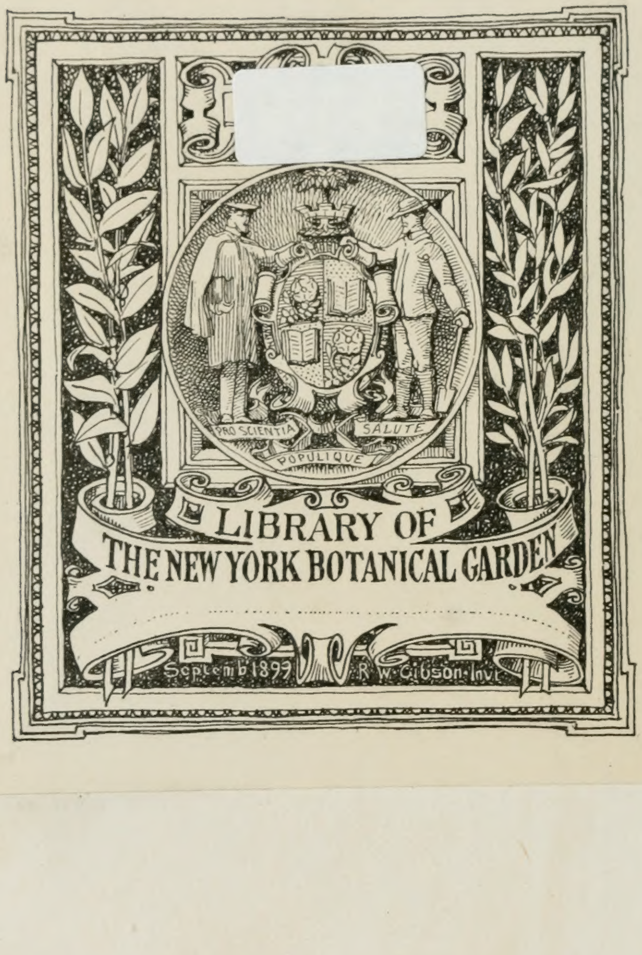

PRO SCIENTIA
SALUTE
POPULIQUE
LIBRARY OF
THE NEW YORK BOTANICAL GARDEN
Septemb 1899
R W Gibson Invt

EIGHTEENTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF AGRICULTURE

OF THE

STATE OF MICHIGAN,

FOR THE

Year Ending August 31st, 1879.

LIBRARY
NEW YORK
BOTANICAL
GARDEN

E PLURIBUS UNUM
TUEBOR
SI QUÆRIS PENINSULAM AMŒNAM CIRCUMSPICE

LANSING:
W. S. GEORGE & CO., STATE PRINTERS AND BINDERS.
1880.

XA
.N 7772
v.18

LIBRARY
NEW YORK
BOTANICAL
GARDEN

State Board of Agriculture.

Hon. HEZEKIAH G. WELLS, of Kalamazoo,
PRESIDENT OF THE BOARD.

Hon. J. WEBSTER CHILDS, of Ypsilanti,
VICE PRESIDENT.

Hon. GEORGE W. PHILLIPS, of Romeo.
Hon. FRANKLIN WELLS, of Constantine.
Hon. MILTON J. GARD, of Volinia.
Hon. HENRY G. REYNOLDS, of Old Mission.
CHAS. M. CROSWELL, Governor of the State, } *Ex Officio.*
T. C. ABBOT, President Agricultural College, } *Ex Officio.*

ROBERT G. BAIRD, Secretary.
EPHRAIM LONGYEAR, of Lansing, Treasurer.

REPORT OF THE SECRETARY

OF THE

STATE BOARD OF AGRICULTURE.

LIBRARY
NEW YORK
BOTANICAL
GARDEN

Agricultural College,
Lansing, August 31st, 1879.

To Chas. M. Croswell, *Governor of the State of Michigan:*

I have the honor to submit herewith to your Excellency, as required by Statute, the accompanying Report for the year ending August 31st, 1879, with Supplementary papers.

Respectfully yours,

ROBERT G. BAIRD,

Secretary of Mich. State Board of Agriculture.

COLLEGE ACCOUNTS

FOR THE YEAR ENDING AUGUST 31st, 1879.

SECRETARY'S ACCOUNT.

Dr.

To balance on hand Sept. 1st, 1878		$16 95
State Treas'r on account of current expense appropriation	$4,023 40	
interest	16,602 02	
		20,625 42
To special appropriations for buildings and repairs	$750 00	
library	500 00	
farm department	1,000 00	
Farmers' Institute	197 39	
insurance	600 00	
		3,047 39
To receipts from College on account of farm department		4,881 64
horticultural department		1,866 14
mechanical department		728 46
apiary		150 05
sales of swamp lands		712 22
library (books sold)		116 28
chemicals (R. C. K.)		37 53
refunded to general account		1 63
account of buildings		10
insurance		60 00
boarding hall (exclusive of students)		816 03
To receipts from students on account of College dues—		
Diplomas	$150 00	
Chemicals	765 55	
Incidentals	1,142 88	
Room rent	577 50	
Matriculation fees	440 00	
Special examinations	72 50	
Board	8,872 68	
		12,021 11
		$45,080 95

Cr.

By cash paid E. Longyear, treasurer		$45,082 61
To balance	$1 66	
	$45,082 61	$45,082 61

SUMMARY OF TREASURER'S ACCOUNT.

Dr.		
To balance Sept. 1st, 1878	$881 37	
cash of Secretary and State Treasurer	45,082 61	
Cr.		
By warrants paid		$45,249 72
balance to new account Aug. 31st, 1879		714 26
	$45,963 98	$45,963 98

The above is a correct summary of my account as treasurer of the College.

E. LONGYEAR, *Treasurer.*

SUMMARY OF WARRANT ACCOUNT.

The warrants drawn during the fiscal year have been charged to the several funds as follows:

Current expenses—			
Expense of State Board		$430 13	
President's office—			
Stationery, postage, etc.	$78 29		
Sunday services	135 00		
		213 29	
Secretary's office –			
Stationery, postage, etc.	$202 93		
Printing	236 75		
Advertising	20 30		
		459 98	
Advances of students refunded		847 38	
Improvement and care of grounds		991 64	
Library—current expense		139 79	
Laboratory—current expense		804 49	
Salaries		17,114 35	
Mechanical department		940 16	
Current expense—incidentals		765 69	
State Fair (1878)		50 33	
College Hall		122 35	
Apiary		39 31	
Fencing		86 51	
Armory		27 43	
Board of employés		87 68	
Society room		100 00	
Farm department (current expense)		2,720 85	
Horticultural department (current expense)		1,663 43	
Boarding Hall		13,402 82	
			$41,007 62
Special appropriations—			
Buildings and repairs		$1,031 01	
Library		510 17	
Museum		91 53	
Chemical department		175 00	
Farm department		693 46	
Horticultural department		200 40	
River improvement		72 66	
Insurance		583 50	
Institutes		211 84	
Engineering department		672 53	
			4,242 10
			$45,249 72

DEPARTMENT ACCOUNTS.

FARM DEPARTMENT

In Account with Agricultural College.

DR.

To cash disbursements on account of current expense—		
Cattle	$255 77	
Hogs	34 67	
Sheep	21 38	
Labor	1,019 29	
Lumber	12 08	
Office	44 45	
Implements	117 02	
Repairs of implements	101 71	
Team	85 47	
Seeds	39 57	
Fertilizers	8 75	
Farm house	713 86	
Buildings	192 02	
Drains	16 20	
Fencing	12 75	
Toll and miscellaneous	45 86	
Total	$2,720 85	
Special appropriation	693 46	
Students' labor	2,480 00	

CR.

By cash receipts on account of—		
Cattle		$1,549 60
Hogs		256 43
Sheep		499 13
Grain		934 91
Team		186 85
Produce		212 88
Labor		503 58
Fertilizers		86
Implements		47 33
Wood		161 75
Farm house		526 32
Increase of inventory		243 53
Balance		771 14
	$5,894 31	$5,894 31

HORTICULTURAL DEPARTMENT

In Account with Agricultural College.

DR.

To cash disbursements on account of current expense—	
Greenhouse	$407 16
Labor	218 00
Office	37 66
Team	414 37
Vegetable garden	52 23
Grounds	90 12
Orchard	55 44
Miscellaneous	160 81

Implements	$138 47	
Seeds	40	
Grapery	14 27	
Fertilizers	40 18	
Ice	24 39	
Fencing	3 20	
Arboretum	6 73	
Total	$1,663 43	
Special appropriations	200 40	
Students' labor	1,353 52	
Decrease of inventory	139 80	

Cr.

By cash receipts on account of—		
Greenhouse		$332 07
Vegetable garden		291 39
Orchard		73 13
Labor		644 65
Team		451 98
Grounds		1 00
Shop		4 06
Fertilizers		18 00
Vineyard		1 00
Ice		48 86
Balance		1,491 01
	$3,357 15	$3,357 15

LIBRARY.

In Account with Agricultural College.

Dr.

To cash disbursements—		
on account of current expense	$139 79	
special appropriations	510 17	
students' labor	70 76	

Cr.

By cash receipts—		
sale of books		$116 28
increase to balance		604 44
	$720 72	$720 72

CHEMICAL DEPARTMENT

In Account with Agricultural College.

Dr.

To cash disbursements on account of special appropriations	$175 00	
cash—current expense	804 49	
balance	222 26	

Cr.

By cash of R. C. Kedzie		$37 53
students		765 55
increase of inventory		398 67
	$1,201 75	$1,201 75

MUSEUM

In Account with Agricultural College.

Dr.		
To cash disbursements on account of special appropriation	$91 53	
students' labor	6 44	
Cr.		
By increase of inventory (by purchase)		$90 00
increase to balance		7 97
	$97 97	$97 97

APIARY

In Account with Agricultural College.

Dr.		
To cash disbursements	$39 31	
students' labor	31 28	
decrease of inventory	21 75	
balance	67 71	
Cr.		
By cash		$150 05
	$150 05	$150 05

MECHANICAL DEPARTMENT

In Account with Agricultural College.

Dr.		
To cash disbursements	$940 16	
students' labor	130 60	
decrease of inventory	59 31	
Cr.		
By cash		$728 46
balance		401 61
	$1,130 07	$1,130 07

BOARD.

The summary warrant account shows the disbursements on account of board, and the Secretary's account shows the amount of cash received from students on account of board till August 31st. Students are boarded at cost. The cash received from them on account of board is simply the balance which they are indebted to board after being credited with the amount of their labor. Board, including fuel, cost during the autumn term of 1878, $2.40; spring term of 1879, $2.65; summer term of 1879, $2.10. An average for the year of two dollars thirty-eight and one-third cents per week.

STUDENTS' LABOR.

The several departments have been charged, and the students have been credited, during the year with labor as follows:

DEPARTMENT.	Hours.	Amount.
Farm Department	31,044½	$2,480 00
Horticultural Department	16,994½	1,353 52
Mechanical Department	1,632½	130 60
President's office	104	8 32
Secretary's office	416¼	33 30
Library	884½	70 76
Organ	110¼	8 82
Mail	888	71 04
Bell	646½	51 72
Armory	139	11 12
Buildings	1,380	110 50
Apiary	391	31 28
Surveying	218½	16 48
Assisting Professor of English Literature	96	7 68
Drawing	55	4 40
Museum	80½	6 44
Botanical class-room	236	18 88
Moving State library cases	496¾	39 74
Total	55,813¾	$4,454 60

SUMMARY OF INVENTORY.

Buildings—		
College Hall	$15,000 00	
Chemical Laboratory	12,000 00	
Williams Hall	45,000 00	
Wells Hall	25,000 00	
Farm house	3,500 00	
Two brick cottages @ $3,000	6,000 00	
One brick cottage	4,000 00	
One brick cottage	3,400 00	
Herdsman's house	600 00	
Six barns at professors' houses @ $300	1,800 00	
Hort. barn and shed	1,100 00	
Cattle barn and shed	3,200 00	
Sheep barn	2,500 00	
Horse barn	3,000 00	
Piggery	2,000 00	
Brick work-shop	600 00	
Corn house	500 00	
Blacksmithshop, tool house, feeding house	400 00	
Three houses (President's and two frame houses)	20,728 00	
Greenhouse	8,000 00	
Bee house	280 00	
		$158,608 00
Twelve fire extinguishers		500 00
Inventory of farm—676 acres @ $70		47,320 00

Farm department—		
Horses	$945 00	
Cattle	6,635 00	
Sheep, $852; hogs, $769	1,621 00	
Crops, produce, etc.	2,813 32	
Furniture and utensils at farm house	631 80	
Implements, office furniture, etc.	4,058 68	
Wind-mills and water supply	450 00	
		$17,154 80
Horticultural Department—		
Plants, fuel, etc., at green house	$3,679 60	
Team, implements, produce, etc.	2,296 55	
		5,976 15
Chemical Department—		
Apparatus, chemicals, etc.		6,189 39
Library—		
Books, pamphlets, furniture		11,045 12
General museum—		
Specimens, cases, etc.		5,741 97
Apiary—		
Bees, tools, honey, etc.		312 50
Department of mathematics and engineering—		
Models, surveying apparatus, telescope, etc.		3,238 15
Mechanical Department—		
Tools, lumber, etc.		103 98
Boarding Hall—		
Furniture, provisions, fuel, etc.		3,590 48
College Hall—		
Furniture in chapel and recitation rooms		700 00
President's office—		
Furniture, stationery, etc.		152 95
Secretary's office—		
Safe, furniture, stationery, etc.		615 50
Botanical Museum and class room—		
Specimens, microscopes, furniture, etc.		4,851 60
		$266,100 59

SUPPLEMENTARY STATEMENT OF THE SECRETARY.

SALARIES OF OFFICERS OF THE COLLEGE.

Theophilus C. Abbot, LL. D., President, Professor of Mental Philosophy and Logic, $3,000.

Robert C. Kedzie, A. M., M. D., Professor of Chemistry and Curator of the Laboratory, $1,800.

Geo. T. Fairchild, A. M., Professor of English Literature and Librarian, $1,800.

Albert J. Cook, M. S., Professor of Logic and Entomology and Curator of General Museum, $1,800.

William J. Beal, Professor of Botany and Horticulture and Curator of Botanical Museum, $1,800.

Robert G. Baird, Secretary of State Board of Agriculture, $1,250.

Rollo C. Carpenter, M. S. C. E., Professor of Mathematics and Civil Engineering, $1,400.

Chas. L. Ingersoll, M. S., Professor of Practical Agriculture, $1,400.
Robert F. Kedzie, M. S., Assistant in Chemistry, $800.
James Cassidy, Gardener, $743.
Emery C. Fox, Steward, $600.
Geo. W. White, First Foreman of Farm Department, $600.
Ransom H. McDowell, B. S., Second Foreman of Farm Department, $400.
Frank A. Gulley, Foreman Horticultural Department, $543.

AGRICULTURAL COLLEGE LANDS.

An act of Congress, approved July 2, 1862, donated to each State public lands to the amount of 30,000 acres for each of its Senators and Representatives in Congress, according to the census of 1860, for the "endowment, support, and maintenance of at least one College, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts."

The Legislature accepted this grant and bestowed it upon the Agricultural College. By its provisions the College has received 235,673.37 acres of land. These lands have been placed in market, and 86,121.46 acres have been sold, giving a fund of $275,104.28, the interest of which at seven per cent is applied to the support of the College. The sale is under the direction of the Agricultural Land Grant Board, consisting of the Governor, Auditor General, Secretary of State, State Treasurer, Attorney General, and Commissioner of the State Land Office. Any information in regard to these lands may be obtained by applying to the Commissioner of the State Land Office.

The following tables, for which we are indebted to the courtesy of the State Land Commissioner, give a detailed account of the sales of Agricultural College lands for the year ending September 30, 1879; also the number of acres yet unsold and the counties in which they are located.

TABLE No. 1, Showing, by Counties, the Amount of Lands Sold (original sales) during the Year ending September 30, 1879.

COUNTIES.	Acres.	Price.	Amount.	Amount Paid.	Amount Due.
Alcona	80.00	$5 00	$400 00	$400 00	....
Antrim	960.00	3 00	2,880 00	800 00	$2,080 00
Benzie	120.00	3 00	360 00	150 00	210 00
Cheboygan	560.00	3 00	1,680 00	540 00	1,140 00
Grand Traverse	120.00	3 00	360 00	90 00	270 00
Kalkaska	1,798.96	3 00	5,396 88	1,449 22	3,947 66
Manistee	520.00	3 00	1,560 00	390 00	1,170 00
Missaukee	600.00	3 00	1,800 00	450 00	1,350 00
Oscoda	40.00	3 00	120 00	120 00	....
Otsego	823.16	3 00	2,469 48	617 52	1,851 96
Wexford	1,160.00	3 00	3,480 00	920 00	2,560 00
Total	6,782.12	....	$20,506 36	$5,926 74	$14,579 62

AGRICULTURAL COLLEGE LANDS.

TABLE No. 2, Showing, by Counties, the Amount of Forfeited Lands Sold during the Year ending September 30, 1879.

COUNTIES.	Acres.	Price.	Amount.	Amount Paid.	Amount Due.
Cheboygan	800.00	$3 00	$2,400 00	$600 00	$1,800 00
Grand Traverse	40.00	3 00	120 00	30 00	90 00
" "	40.00	4 50	180 00	45 00	135 00
Leelanaw	40.00	4 00	160 00	40 00	120 00
Manistee	80.00	3 00	240 00	60 00	180 00
Missaukee	160.00	3 00	480 00	120 00	360 00
Presque Isle	78.06	3 00	234 18	60 00	174 18
Wexford	80.00	3 00	240 00	60 00	180 00
Total	1,318.06		$4,054 18	$1,015 00	$3,039 18

TABLE Showing Amount of Unsold Agricultural College Land September 30, 1879.

COUNTIES.	Acres.
Alcona	26,390.43
Alpena	520.00
Antrim	8,752.38
Benzie	5,960.00
Charlevoix	3,684.98
Cheboygan	4,620.18
Grand Traverse	880.00
Iosco	27,115.88
Kalkaska	3,517.78
Manistee	8,680.00
Missaukee	3,595.89
Montmorency	9,922.95
Oscoda	17,145.27
Otsego	4,939.94
Presque Isle	1,080.00
Wexford	28,720.00
Total	155,525.68

DEPARTMENT REPORTS.

REPORT OF THE PRESIDENT.

The report of the faculty as a body, and of the heads of the departments, so fully describe what has been done during the College Year, that but little remains to be given in my report. The President's report for last year contained a very full account of the various departments of the College, and it is unnecessary to repeat the account here.

I have given, as usual, instruction in Psychology, in the Constitution of the United States, and in Logic.

The clergymen of Lansing, have usually, as heretofore, been employed to take charge of the religious services in the College chapel on Sunday afternoons; although Secretary Baird has preached twice, and I have occupied the desk seven times. No officer has ever been paid for Sabbath services.

Dr. Henry Reynolds, the Red Ribbon temperance lecturer, occupied one Sunday afternoon, and the Hon. D. W. Sharts, of Shiawassee county, and President White, of Purdue University, have given addresses before the College Christian Union, that is, virtually before the whole College.

We have also been favored with addresses, either at the general gatherings on Wednesday afternoon or at morning prayers by the Rev. L. L. Langstroth, of Oxford, Ohio, noted for his observations on Bees, by Professor Olney of the University, the Hon. Charles E. Mickley, of Adrian, the Hon. J. J. Woodman, Master of the State Grange, Hon. C. G. Luce, of Coldwater, W. S. George, Esq., of the Lansing Republican, and Alvah Bradish, the Detroit Artist.

LEGISLATION.

In his message to the Legislature, Governor Croswell said:

> "The Agricultural College grows in favor. It has become more thoroughly identified with the farming interests of the State, and stands on a better footing than ever before. The whole number of students in attendance during the last year was 239, and the graduates, 33. The managers ask an appropriation for current expenses of $6.271.80 for each of the two years 1879 and 1880, and a special appropriation of $15,968.32 for each of the said two years for buildings, improvements and extraordinary expenses; a full statement of which will be found in their report. They further solicit an appropriation of $13,600.00 for the construction of a new Hall, with a view to the admission of females and the co-education of the sexes at the College, the reasons for which will be found duly assigned."

A statement of estimates, far exceeding in its detail of items those of any other institution was placed before the Legislature, and by their order printed in the journal of March 26, 1879. From these estimates the Legislature struck off that for the enlargement of the chemical laboratory, very much crippling the growth of that department of the College, and making necessary the rejection of several applicants for admission to the College. They also struck off $1,000 for the estimate for building a house with furnace, and a barn for the professor of agriculture, leaving $3,000,—$1,500 from the estimates for farm improvements,—$900 from the estimates for various departments, and $1,000 a year from the salaries of professors, compelling the Board to reduce salaries from $2,000 to $1,800 a year.

The bill as passed, and approved May 27, 1879, appropriates for 1879 and 1880.

For a professor's dwelling-house, with furnace and barn, and for other expenses connected therewith, $3,000; for a botanical laboratory, $6,000, both in 1879; for current expenses of 1879, $4,971.80 and the same for 1880. For Farmer's Institutes of both years, $600; for insurance, $600; for the library, $2,000; for the department of mathematics and civil engineering, $1,020; for the department of zoölogy and entomology, $800; for the chemical department, $1,000; for the horticultural department, $2,810; for the farm department, $4,016.64, and for buildings and repairs outside of the above named departments, $1,290. The total appropriation for 1879 amounts to $21,040.12; and for 1880, $12,040.12.

The Botanical Laboratory, the new dwelling, the Gardener's rooms in the green-house and the propagating pits, for which appropriations were made, are on their way to completion.

The bill for the erection of a hall for ladies failed to pass.

OFFICERS,

The report of the Faculty of the College speaks of the resignation of Prof. Geo. T. Fairchild, who takes presidency of the Kansas Agricultural College. The agricultural College over which Professor Fairchild, after fifteen years' of service in this College, has been called to preside, is at Manhattan. It has thirteen professors and instructors, and one hundred and sixty-nine young men and sixty-nine ladies, or students in a four years' course of study. They have a mechanical department, a printing department, a telegraph department and a woman's industrial department. Only a small amount of labor is required of students, and that is educational and not paid for. Labor is furnished students on application and compensated at from 3 cts. to 10 cts. an hour. The institution being in the village, there are no dormitories. The professor of agriculture appointed in 1874 is a graduate of the Michigan Agricultural College, and so for several years was the professor of chemistry until his acceptance of a chair in Oberlin College. One may see from this sketch of Kansas Agricultural College, that Professor Fairchild has gone to a kindred institution, whose experience we may avail ourselves of from time to time.

The Faculty report speaks also of the resignation of Professor Charles L. Ingersoll, and his acceptance of the professorship of Agriculture in Purdue University, La Fayette, Indiana. His report of experiments has been handed in, but the report of the general management of the farm will have to be compiled by his successor after the completion of the posting of accounts, and may not appear in this volume. A report has been circulated that the professor of agriculture has received less salary than the other professors. This is not the case and never has been. There being no dwelling-house at the time of the appointment, for Prof. Ingersoll, it was arranged that he should take charge of Farm House, until a dwelling could be had; and for his entire services to the College he received the living of himself and family in furnished rooms, and at first $500, and afterwards $400 less in cash than the others. His salary was always considered by the Board to be fully equivalent to that paid to any professor.

Professor Ingersoll goes to an institution where the agricultural department is to be built up almost from the foundation. He is to have, it is said, no responsibility for the general management of the farm, but only of the experimental portion of it,—about ten acres. A graduate of the Michigan State Agricultural College, we shall be proud of his success in his new field of labor.

Mr. Henry E. Owen, a graduate of the class of 1878, has been employed as an assistant in the horticultural department and has taught Ancient History to the freshmen class, in two sections, during the autumn term. Mr. Frank Benton a member of the Senior class, has had charge of the classes in French two hours a day throughout the year.

The following is a list, perhaps incomplete, of the Wednesday afternoon lectures in the College chapel:

By President Abbot—On Novel-reading, and the Utility to the Farmer of the study of Botany.

By Dr. Kedzie—On the New Alchemy, or the Notion that Metals are Compounds.

By Professor Fairchild—On Debt and Credit.

By Professor Cook—On Snakes, and on Claude Bernard.

By Professor Beal—On College Experiments, and on the Relation of Botany to Horticulture.

By Professor Ingersoll—On Milk of different breeds of Cattle. A subject which he had been investigating jointly with Mr. Robert F. Kedzie, the assistant in Chemistry.

By Professor Carpenter—On Stephenson, and on Railroad Transportation.

Mr. W. S. George lectured on the Currency, and Mr. Alvah Bradish, on How to judge of Works of Art.

STATE FAIR.

The report of the Faculty gives quite at length the relations of the College to the State Agricultural Society. In September, 1878, an exhibition was made by the College. Dr. Kedzie, from the Chemical Department, exhibited soils from various parts of the State in glass jars with analyses. He afterwards gave an address at the Farmer's Institutes in Dowagiac and Bay City, and in this address drew from the analyses encouraging lessons for our State. Dr. Kedzie also exhibited specimens of maize with analyses. The Horticultural Department exhibited specimens of potatoes and of grasses. The farm department showed a large number of varieties of wheat plants. The objects exhibited attracted much attention at the fair.

DONATIONS.

The College has been the recipient of many presents, a list of which appears in the report of the Secretary. The Michigan Central Railroad, the D., L. & N. R. R., the C. & N. E. R. R., and the C. & L. H. Railroads have all been very generous in reductions of fare made to students at times of the short vacations—not this year only, but in several preceding years.

T. C. ABBOT, *President.*

REPORT OF THE FACULTY.

The Faculty of the Michigan State Agricultural College respectfully submit to the State Board of Agriculture their annual report for the year ending August 31, 1879:

On September 1st, 1878, the Sophomores and Freshmen were entering upon the first term of their respective years, while the Seniors and Juniors were commencing the third or last term of their years. Commencement season for the graduating classes of 1878 and 1879 is in November, but succeeding classes will be graduated in August.

COMMENCEMENT, 1878.

The baccalaureate sermon was preached by the President of the College November 17th, in the College chapel. The Class Day Exercises took place in the evening of November 18, excellent music being furnished by the Eight O'Clock Club, an amateur club of the city of Lansing. An Oration was delivered by Mr. W. K. Prudden, a Poem by Mr. Eugene Davenport, a History by Mr. R. H. Gulley, a Prophecy by Mr. W. S. Holdsworth, and an address by the class president, Mr. Eugene Gregory. The exercises were said to be excellent.

The exercises of the graduating class took place on the forenoon of Tuesday, November 19th. The music was furnished by the Franz Schubert Club of Jackson, an amateur club of very high excellence. Ten members were chosen by lot to represent the class. These spoke in alphabetical order, according to the following

PROGRAMME:

War March,	*Mendelssohn.*
Overture—"William Tell,"	*Rossini.*
Prayer.	
Longing,	*Lange.*
Rights and Wrongs of Labor,	Henry F. Buskirk.
Why We Seek a College Education,	Carlton V. Hinman.
If I Were King	*Adam.*
The Motive of the True Artist,	Will S. Holdsworth.
The Farmer as a Business Man,	Emmor O. Ladd.
Silver Star Waltzes.	
Put Yourself In His Place,	Robert T. McNaughton.
Nature's Gifts,	J. T. Monroe.
Selections from Barber of Seville.	
Conditions of Our Civilization,	Edward J. Rawson.
Is Universal Suffrage a Failure?	Frank E. Robson.
Trombone—Solo.	Mr. F. Titus.
A Tribute to Alma Mater,	Fremont E. Skeels.
"Faint Heart ne'er Won Fair Lady,"	Elisha D. A. True.
Selections from Puritani.	
Conferring of Degrees.	
Gallop,	At Full Speed
Benediction.	

The degree of Bachelor of Science was conferred upon the thirty gentlemen whose names follow: George E. Breck, Paw Paw; Henry F. Buskirk, Bradley; Henry V. Clark, Ransom; Theodore P. Caulkins, Thornville; Eugene Davenport, Woodland; Harry E. Emmons, Orion; Charles C. Georgeson, Denmark; Eugene Gregory, Allegan; Richard H. Gulley, Dearborn: Frank W. Hastings, St. Louis; Carlton V. Hinman, Portland; Will S. Holdsworth, Traverse City; Emmor O. Ladd, Old Mission; James P. Lewis, Falls City; Robert T. McNaughton, Jackson; James E. Miller, Lansing; Jay R. Monroe, South Haven; Henry E. Owen, Adrian: Joel S. Pardee, Berrien Springs; William K. Prudden, Indianapolis; Edward J. Rawson, Decatur; Albert A. Robinson, Detroit; Frank E. Robson, Lansing; Ralph D. Sessions, Ionia; Charles F. Shilling, Sturgis; Fremont E. Skeels, Grand Rapids; Clement J. Strang, Charlotte; James Troop, Matherton; S. Satterlee Trowbridge, Birmingham; Elisha D. A. True, Armada.

This is the largest class ever graduated by the College, and brings the number of its alumni up to one hundred and eighty-six.

STUDENTS.

The students in attendance since the last annual report, are, as given in the 22d annual catalogue issued in the autumn of 1878, as follows:

Resident graduate	1
Seniors	31
Juniors	24
Sophomores	75
Freshmen	77
Specials	31
Total	239

Applicants for instruction in analytical Chemistry have in several instances been denied admission into the College, as every possible place for students to work in was already occupied.

The average age of the students was between 20 and 21 years.

The following is a table of the number of students from each county:

Allegan	7	Kalamazoo	2
Barry	1	Kent	4
Bay	1	Lapeer	4
Berrien	4	Lenawee	7
Branch	2	Livingston	1
Calhoun	3	Macomb	3
Cass	4	Mason	3
Clinton	8	Mecosta	1
Eaton	9	Midland	1
Genesee	2	Monroe	4
Grand Traverse	3	Montcalm	6
Gratiot	1	Newaygo	1
Hillsdale	4	Oakland	17
Ingham	32	Oceana	3
Ionia	14	Ontonagon	1
Jackson	7	Otsego	1

Ottawa	5	Tuscola	1
Saginaw	1	Van Buren	21
Shiawassee	2	Washtenaw	2
St. Joseph	12	Wayne	12

Total from the State 217

From California	1	Kentucky	1
Connecticut	1	Nebraska	1
Denmark	1	New York	4
Illinois	4	Ohio	1
Indiana	4	Pennsylvania	1
Kansas	1	Wisconsin	2

Total out of the State 22

Whole number 239

INSTRUCTION.

The following schemes represent most of the work done in the class room for each of the three terms of the College year. There has been, besides, a weekly meeting of each class for rhetorical exercises, and various lectures have been given not represented here:

AUTUMN TERM, 1878.

CLASS.	8 A. M.	9 A. M.	10 A. M.	11 A. M.
Seniors	Botany, A, 6 weeks.	Botany B, 6 weeks. Landscape Gardening, 6 weeks.	Civil Engineering.	Logic.
Juniors	Astronomy, 6 weeks. Anatomy, 6 weeks.	Meteorology.		English Literature.
Sophomores	French, A.	Geometry, A. French, B.	Geometry, B.	Elementary Chemistry.
Freshmen	Composition and Rhetoric A.	Algebra, A. Composition, B.	History, B.	Algebra, B. History, A.

SPRING TERM, 1879.

	8 A. M.	9 A. M.	10 A. M.	11 A. M.
Senior	Physiology.		Pyschology.	Moral Philosophy.
Sophomore	Trigonometry, A, 6 weeks. Surveying, A, 6 weeks. Chemistry, B.	Trigonometry, B, 6 weeks. Surveying, B, 6 weeks. French, A.	Organic Chemistry and Blowpipe analysis.	Chemistry, A. French, B.
Freshman	Agriculture	Book-keeping, A. 3 weeks. Botany, B, 9 weeks.	Algebra, A.	Botany, A, 9 weeks. Algebra, B.

SUMMER TERM.

Senior	Agriculture.	U. S. Constitution, 6½ wks. Pol. Economy. 6½ wks.	----------------	Zoology 6½ weeks. Geology, 6½ weeks.
Sophomore	Mechanics.		Analytical Chemistry.	
Freshman	Botany, A.	Botany, B. Geometry, A.	Geometry, B. French, A, 11 weeks.	French B, 11 weeks. Chemistry, 2 weeks.

The Sophomore and Freshman classes being large were instructed in sections represented in the scheme by A and B. Each officer gives a report of his own department, and reference is made to these reports for a fuller account of the instruction imparted to the students.

The students have kept up their various society organizations, and the College Cadets have drilled regularly twice a week, and have had some practice with the State arms now on deposit in the College Armory. The Christian Union and Natural History Society have their membership from the faculty as well as students, and have done excellent work throughout the year.

FARMERS' INSTITUTES.

Six Farmers' Institutes (constituting the Fourth Annual Series), were held in January and February, 1879. A detailed account of them will appear in the report of the Secretary of the State Board of Agriculture for 1878. Since the inauguration of these institutes in 1876, many independent institutes have been held under the direction of granges, societies and clubs throughout the State, doing valuable service similar to that of the institutes appointed by the State Board of Agriculture. The College series of institutes were in Bay City, Centreville, Charlotte, Dowagiac, Flint and Howell. These were all well attended by enthusiastic and intelligent farmers, who, according to arrangement, furnished at least one-half of the papers and discussions.

OFFICERS.

The Faculty regret the loss of Mr. Charles L. Ingersoll, who resigned the Professorship of Agriculture in this College August 31, 1879, to take a similar position in Purdue University, Fayetteville, Indiana. Professor Ingersoll was graduated from this College in 1874. He was selected by Professor Gulley to be Foreman of the Farm in 1875, and in 1876 succeeded him as Professor of Agriculture. Besides his instruction in the class-room, and his care of the farm, he has been active in promoting the good of the College in many ways. The Christian Union always found him a ready and valuable worker, as one of its officers, and as teacher or superintendent in its Sunday school. He had gone under Sherman, "from the mountains to the sea," and to his knowledge and enthusiasm the College cadets owe more than to any other one, their efficiency in drill, and in target practice. He was the captain of the company. Professor Ingersoll was a valuable officer in every department of his labors, and we wish him ample success in his new field of labor, where we shall feel that he is still a co-worker with us.

Another serious loss will be to be deplored at the close of the autumn term, 1879. At that time Mr. George T. Fairchild resigns his professorship of English Literature to assume the presidency of the Kansas Agricultural College at Manhattan, Kansas. During the most of the fifteen years of his service in this College he has taken charge of the instruction in Rhetoric and English Literature, and in the important departments of Political Economy and Moral Philosophy. A considerable portion of the instruction in the French language has been given by him. He was also the Librarian of the College, and under his care the library has increased not more in the number of volumes than in utility, owing to classification and cataloguing,—all the result of the Professor's skill. He acted as president in the absence of the president at one time for a year. The College owes much to his wisdom and cooperation in its general management. He carries with him the sincere regard and affection of the officers of this institution.

As in the case of Professor Ingersoll. so in this, our loss links closer to us another institution similar in constitution and aims.

ALUMNI RE-UNION.

The Alumni of the College held their second triennial re-union at the College at the close of the summer term, August 26th, 1879. The representatives of the various classes met separately the previous evening, seventy-nine in all, every class but one being represented. The public exercises in the chapel consisted of an address by Professor W. W. Daniels, of Wisconsin University, a graduate of the class of 1864, and a History by Professor R. C. Carpenter of this College, a graduate of 1873. The music was furnished by Graduates of the College under the direction of Mr. Frank Hodgman, of the class of 1862, reviving the recollection of times when he was leader of the choir and of the glee club of the College. The address was a well-considered discussion of the relations sustained by graduates of such colleges as ours to the legislation and welfare of the State, and the history was an account of the progress of our College from its earliest times through its trials, to its present condition.

In the afternoon, after a business meeting of the Alumni, there was a joint meeting of the State Board of Agriculture, the Faculty and the Alumni. The Hon. H. G. Wells, president of the Board since its creation by the Legislature, presided, and there was a free interchange of thought regarding the interests of the institution. A banquet in the evening in the dining room of the Boarding Hall closed this very enjoyable and profitable gathering. Two of the earlier officers of the institution participated in these Alumni exercises, the Hon. Witter J. Baxter, of Jonesville, a member of the Board of Education when the College was undertaken and founded, and James Bayley, Esq., of Birmingham, Farm Superintendent in 1860 and 1861.

The Alumni now number one hundred and eighty-six, and a class (19) is to be graduated in November. Of these one hundred and eighty-six, one hundred and eight are found to be directly employed in business related to the industrial arts. The catalogue for 1879 will have, within its covers, a general catalogue of the College, giving the names, residence, and present occupation of its graduates.

STATE AGRICULTURAL SOCIETY.

The College and the State Agricultural Society sustain but few legal relations to each other. The location of the College was made in accordance with provisions and under certain restrictions of law, by the president and executive committee of the State Agricultural Society, June 16, 1855. The report of the Secretary of the State Agricultural Society is, by law, published as a part of the report of the Secretary of the State Board of Agriculture. But for the most part the intercourse of the two bodies is left to their own likings.

The College early received from the Agricultural Society the gift of the Society's library. Not infrequently the same person has been connected with the College and the Society, the president of the College throughout the earlier and darker days of the institution regularly attended the winter meeting of the executive committee of the Society, and was always courteously asked to give an account of the College and to participate in the doings of the committee, and in 1864 the State Board of Agriculture and the State Agricultural Society held jointly a Farmers' Institute in Ypsilanti.

During the past year a step worthy of record here has been taken towards a closer union of the College and the Society,—a step due to the suggestion of Mr. W. L. Webber, of East Saginaw, president of the Society. As a member of the Senate in 1875 Mr. Webber took a deep interest in the College, and subsequently read an essay before the State Pomological Society at their Jackson meeting, December 8th, 1875, on the College. He now proposed that the executive committee should meet from time to time at the College on the invitation of the State Board of Agriculture. The portion of his annual address with this recommendation and the subsequent action of the committee are given in full in the Report of the State Board of Agriculture for 1878, pages 477, 478, and 500. The committee recommended the addition of a Veterinary Department to the College, a recommendation made previously by the Faculty of the College. See same report, page 45. Cordially responding to the action of the executive committee of the State Agricultural Society, the State Board of Agriculture invited the committee to meet them at the College on June 25th. They also invited the President and Secretary, and Committee on the College of the State Grange to meet with them.

The State Agricultural Society was represented by Hon. Wm. L. Webber of East Saginaw, its President, R. F. Johnstone, Secretary, D. W. Howard, Pentwater; H. O. Hanford, Plymouth; F. M. Manning, Paw Paw: A. F. Wood, Mason; F. V. Smith, Coldwater; D. T. Dewey, Owosso; J. W. Childs, Ypsilanti; S. M. Sterling, Monroe; Geo. W. Phillips, Romeo; Wm. Ball, Hamburg; W. H. Cobb, Kalamazoo; Henry Fralick, Grand Rapids; A. O. Hyde, Marshall; Philo Parsons, Detroit; W. G. Beckwith, Cassopolis.

The State Grange was represented by Master J. J. Woodman, Paw Paw; Secretary, J. T. Cobb, Schoolcraft; C. G. Luce, Coldwater, and J. W. Childs, Ypsilanti.

The day was spent in an examination of the workings of the College in its several departments, and of the farm and horticultural departments.

A meeting was held in the chapel at three for a comparing of views as to the College, in which nearly all the gentlemen present participated. The expressions of confidence in the College and its management were very encouraging, and the members of the State Grange declared that its members without a dissenting voice were in favor of liberal appropriations, such as the College had not received from the last Legislature.

The following resolutions, as reported in the Lansing Republican, were unanimously adopted by the executive committee and the officers of the grange:

Resolved, That in the opinion of the State Agricultural Society, the end and aims of this Society, of the Agricultural College, and the State Grange are the same,—that of educating and elevating the farming class.

Resolved, That it is eminently wise that there be an annual meeting of the State Agricultural Society at the College for the purpose of examining the work done by the College, and of aiding the Faculty by advice and criticising them when necessary.

Resolved, That the members of the State Agricultural Society commend the work done by the College, and that they believe it to be exerting a great and good influence in behalf of agriculture.

Resolved, That we learn with pleasure that more than 50 per cent of the graduates are farmers, and that we believe the influence exerted by these graduates is a hopeful promise for the College and for the elevation of the farmer.

Resolved, That the State Agricultural Society expresses a feeling of regret that the last Legislature denied the College the appropriations asked for by the board.

THE STATE GRANGE.

It was natural that the State Grange, represented by men who, in their smaller organizations insist on the necessity of a general and a professional education, should take notice of the work done by the Agricultural College. The committee of the State Grange on Education have visited the College at various times and made reports always favorable to the institution, and at one time recommending the establishment of a Veterinary department, and a department for ladies, urging the legislature of 1879 to provide for it. The reports made by the committee were unanimously adopted by the Grange.

December 10, 1878, the Hon. J. J. Woodman, Master of the State Grange, in his annual address brought the College prominently to the notice of that body. Having fought its battles in several legislatures, years ago, he was not ready to forget the College now. On December 11th, on motion of Mr. F. M. Holloway, of Hillsdale, the following resolution was adopted:

Resolved, That to the list of standing committees another committee be added, to be known as the Agricultural College Committee, whose duty it shall be to consider the relations and workings of said College to the people of the State; its ability to advance our agriculture, to elevate our social surroundings, and to set forth to the Order the special advantages to be derived from this State institution by our sons and daughters: that the committee be composed of three or more members selected from the executive committee and the State Grange officers, and required to report annually. We advise such committee be made up from these officers, as they only hold over from year to year, and therefore the only ones from whom a report could be assured.

Messrs. Holloway, Luce and Childs were appointed to constitute this committee on the College, and the committee has visited the College during the year.

Meanwhile the committee on Education reported that the College had proved a success, recommended the establishment of a Veterinary department, and the adoption of resolutions asking the Legislature to make a liberal appropriation for buildings for the admission of ladies into the College.

Thus the Farmers' Institutes, the Agricultural Society, the Grange and the State Pomological Society, although no special notice of it has been made in the foregoing remarks, are all helping the College to extend its influence among the practical farmers of the State, while the Alumni, by their outspoken attachment to the College, give us great encouragement in our work.

T. C. ABBOT.

REPORT OF THE PROFESSOR OF ENGLISH LITERATURE AND LIBRARIAN.

To the President of the College:

The following report is meant to include a brief mention of all the work done under my immediate supervision during the year ending August 31st, 1879:

During the autumn term of 1878 I gave instruction to the Junior Class in English Literature by a course of fifty daily lectures with daily reviews. The usual ground, including history and relations of the English language, outline of history of literature in England by epochs and ages, and biographical sketches of the leading authors from Chaucer to Burns, with critical remarks upon selections from each author studied. The course was too brief to be more than an introduction to standard literature, and but brief notices of the writers of this century in England and America accompanied an outline of more modern characteristics and fame. Chambers' Cyclopœdia of Literature was an efficient aid to the lectures and the criticism. The class numbered 27, of whom 21 passed the final examination at the close of the term. Of six who left to teach before finishing the course, four have since passed examination; the others have not yet returned to College.

The Freshman Class with persons in select courses made two classes in English Composition, one of which numbered 40 and the other 27. The course, during eleven weeks of the autumn term, embraced in Hart's Rhetoric the subjects of punctuation, style, invention and varieties of composition, with weekly exercises in essay writing. The essays were carefully revised under my direction with especial care for accuracy, neatness and method in expression of thought. In this I received efficient aid from Mr. Eugene Davenport of the Senior class, who was assigned to this work under my supervision. Of the 67 members of this class five left before the close of the term, and four failed to pass the final examination. Two of these have since taken a special examination and passed.

During the spring term I taught the Senior class in the usual course in Fairchild's Moral Philosophy. The class numbered 28, one of whom left on account of sickness, and the rest finished the course successfully.

A six weeks' course of lectures to the Seniors in political economy completes my classroom instruction outside of rhetorical exercises. In this study the short period of time devoted to it compels haste in both lectures and reviews. This year I adopted the plan of giving one hour each week to a review of the four lectures given upon the previous days. This in some respects was more satisfactory than the usual brief daily review. The class numbered twenty-five, one of whom left on account of sickness, and twenty-four passed the final examination. The time devoted to this study in the course seems too limited to both professor and students.

The larger part of my work of instruction has been devoted to the rhetorical exercises. In these I have had charge of seventy-one Freshmen, fifty-three Sophomores, and twenty-six Seniors, all of whom I have met once each week in five classes. I have also given from two to five hours each week to rehearsals preparatory to final delivery before the classes or the body of students. The Freshmen have had essays and declamation, in alternation, one every three weeks. The Sophomores have had essays and declamations alternating every two weeks during the spring term, and original declamations every four weeks during the summer term. During the autumn term of 1878 they were under the instruction of Professor Cook. The Seniors have had exercises in select reading, in essay writing, in scientific exposition and in analysis. Each has prepared and delivered four orations before the body of students in the Chapel. During the summer term I have given a series of lectures upon subjects directly connected with rhetoric in practice.

All the orations and original declamations and most of the essays have passed under my criticism *before* being presented: a few have been accepted and afterward criticised. In most cases criticism of the orations is accompanied with personal explanation of reasons for any change, and suggestions as to the logic of the thought and correctness of statements as well as proper sources of materials. All this work I have found very wearing, and yet I have been grateful to yourself and the Board for such an arrangement as, by relieving me from the teaching of French, permitted me to take the task in my own hands. I have long felt the necessity of giving more continuous attention to the drill in English composition and English speaking which must hold so important a place in every course of study.

I have given but one of the regular Wednesday lectures this year, having given place once to a number of Senior orations which had been delayed by various circumstances beyond their appointed time.

Other important works of the College has fallen upon me as Chairman of the Committee upon Examinations. This has included, beside my share in the examination of applicants for admission, compilation of statistics, and reports, arrangement for all select courses, and preparation of schemes for class exercises and examinations. It has naturally, too, brought many requests for advice in regard to plans of individual students. In the work of special committees I have had my share of the burden.

During three weeks of the summer term (the president having leave of absence), I had the general duties of the executive officer, and throughout the year in temporary absences of the president the students were referred to me as substitute.

In the winter Farmers' Institutes my part was general oversight of the organization of the one at Flint, and an address at Flint and Charlotte. All other work away from the College I have felt obligedto decline. At the College I have kept my place as teacher in the Sunday school with but one absence, and have read two short papers before the Natural History Society.

Incidentally, under the advice of the committee of the Board of Agriculture upon buildings, etc., I have given some considerable attention to the plan of the dwelling now in process of erection. Extra attention was made necessary by the difficulty of providing sufficient accommodation with the funds at disposal of the Board, and my personal interest as the probable occupant of the dwelling designated me for the task.

THE COLLEGE LIBRARY.

The usual routine of work in the College Library has occupied four different Seniors for a trifle over 800 hours. The books have been kept in excellent order and the library has been much frequented during the daily opening from 4 to 6 P. M. On Saturday the hours of opening have been changed to the morning from 10 to 12, and afternoon from 5 to 6. This seems to accommodate the students better than the old plan of opening from 3 to 6 P. M.

The whole number of books taken from the library during the year is 1,835, classed as follows: Agricultural 132, Horticultural 34, Scientific 274, Biographical 110, Historical 146, Fiction 292, Miscellaneous 847. Consultation of books in the Library is more frequent as the works of reference are multiplied.

The Library has been increased by the purchase of 119 bound volumes and the binding up of 167 volumes of periodicals. Donations have included 81 bound volumes and 77 pamphlets besides some seventy periodicals, all of which are acknowledged in the Secretary's list of donations. The periodicals taken upon subscription have been as follows:

Atlantic Monthly.
Harper's Magazine.
North American Review.
International Review.
Blackwood's Magazine, (Reprint.)
British Quarterly Review, "
London " " "
Westminster Review, "
Edinburgh Review, "
Contemporary Review.
The London Times.
The Nation.
Detroit Post and Tribune, Daily.
Van Nostrand's Engineering Magazine.
Engineering (London.)
The Country Gentleman.
American Agriculturist.
American Stockman.
American Journal of Science.

American Naturalist.
American Bee Journal.
American Quarterly Microscopical Journal.
Poultry World.
Vick's Monthly.
Manufacturer and Builder.
Canadian Entomologist.
Nature.
Agricultural Gazette.
Live Stock Journal.
Gardener's Chronicle.
The Garden.
Florist and Pomologist.
Chemical News.
Journal of Chemical Society.
Quarterly Journal of Science.
Popular Science Review.

Recently have been added reprints of the Fortnightly Review and the Nineteenth Century.

The purchase of books included 90 back volumes of the North American Review, completing the set with the exception of the first nine volumes. Other purchases were mostly in the department of engineering and architecture.

By favor of the State Board of Auditors cases from the old State Library were placed at our disposal. Of these twenty-one have found place in our Library, adding convenience and ornament. This necessitated a re-arrangement of the books and the newspaper desks and tables. At the same time the most frequented parts of the floor were covered with matting as recommended last year. The general effect of these improvements is pleasing to all.

The expenditures for the year amount to $649.96 classified as follows:

7816

Books for the library	$160 01
Periodicals	148 13
Binding	193 12
Postage and exchange	10 65
Express and freight	8 75
Stationary, blanks, etc	5 98
Furniture and matting	54 80
Labor in cleaning, etc	3 48
Books to be resold	65 04

60116

For the general account of the Library I may refer to the financial report of the Secretary of the College.

But little work has been done upon the catalogue of subjects proposed last year, chiefly for want of time on the part of the librarian to give needed oversight. A rough draft has been made of an index to biography, as a beginning from which to advance. This was hindered by the additional work caused by the improvements mentioned above. This draft should be put into shape suitable for use, and a competent person should be employed to continue the work, especially into the agricultural and scientific miscellany.

Hoping that more attention can be given to the growth and use of the Library hereafter, I respectfully submit the above report.

GEO. T. FAIRCHILD,
Professor of Eng. Lit. and Librarian.

STATE AGRICULTURAL COLLEGE,
Lansing, Mich., November 18, 1879.

To the President of the College:

Having accepted a call to the presidency of the State Agricultural College of Kansas, I beg leave to submit the following supplementary report for the term just closing.

During this term I have given instruction to the Senior, Junior and Sophomore classes in Rhetorical exercises, meeting them in four divisions weekly. The whole number upon my rolls is 110, and the whole number of exercises, including 25 orations, is 275. The commencement exercises have also been prepared under my oversight, involving much consultation and many rehearsals with the 16 exercises presented.

The Freshman class in composition, numbering 65, has recited in two divisions. Each member has presented nine written exercises for correction, making a sort of weekly examination upon the subjects passed over. The burden of these exercises,—more than 600 essays,—has been lightened by the aid kindly rendered by Mr. Louis G. Carpenter of the Senior class, working in my presence and under my advice. The class was examined on the 13th of November, and the report is now in the hands of the secretary.

The Juniors have had a voluntary class in Shakespeare to which I have read the Merchant of Venice with much interest on their part and much pleasure on mine.

The Library remains in much the condition described at the close of the College year, 1878–9. The work of re-arrangement has been perfected, and the new classification has been transferred to the catalogue. Few purchases have been made,—14 volumes in all. Donations have been eight pamphlets, four bound volumes and a miscellaneous collection of agricultural papers, most of which are duplicates of what we before possessed.

I have been absent from duty one week, during which my class in composition was taken by Professor Cook.

In closing this report of the last term's work in a period of fifteen full College years, I cannot refrain from expressing satisfaction at the growth in strength and favor made by the College in these years. I go away feeling a faith in the good work of this institution, which is to be my main support in the new field of labor, and my thoughts will still turn to my long-time associates here for advice and encouragement in similar cares elsewhere. I cannot feel that I am diminishing the influence of this College by carrying the same spirit to a sister institution in greater need; if it seemed so, I should hesitate.

With many wishes for prosperity in these coming years, this last of many reports is

Respectfully submitted,
GEORGE T. FAIRCHILD.

REPORT OF THE PROFESSOR OF ZOÖLOGY AND ENTOMOLOGY, ETC.

AGRICULTURAL COLLEGE,
Lansing, Mich., September 30, 1879.

To the President of the College:

I submit the following report for the year ending September 30, 1879:

INSTRUCTION.

In the fall of 1878 the Sophomore class completed the study of Geometry under my charge. They had already completed eight sections of Olney's Geometry under the supervision of Prof. R. C. Carpenter. The class numbered seventy-eight, and recited in two divisions. Of this number fifty-seven completed the course and fifty-two passed the examination. I also gave instruction to the same class in Rhetoricals. Each of the two divisions met me for one hour each week. Each student prepared two essays and two declamations, which were read or delivered before the class. I also gave the usual course of lectures on Human and Comparative Anatomy to the Senior class. There were twenty-one members in the class.

In the spring term, thirty-one of the Freshman class, all those who could not pass a satisfactory examination, pursued the study of book-keeping under my direction for three weeks. Mayhew's text-book was used, and all the students of the class passed upon examination. The Senior class, numbering twenty-seven, completed the usual course in Physiology. Dalton's text-book was used.

During the summer term one division of the Sophomore class, numbering twenty-four members, completed the subject of Mechanics of Solids, and Mechanics of Liquids to specify gravity, as given in Peck's text-book, which was used. All, with one exception, passed the examination. The subject of Zoölogy occupied the Senior class for six weeks. The class numbered twenty-three. Nicholson's text-book was used. The time for this study is too short by half. Geology was studied for the balance of the term. The class numbered twenty-two. Dana's Geology was used as a text-book.

The work of instruction for the year has been pleasant, as the students have shown a very satisfactory and commendable energy, and have made corresponding progress in their studies.

MUSEUM.

The General Museum has made considerable growth during the year. Additions have been made both by donation—see list appended to this report—and by purchase. Among the latter, several skeletons, an ornithorhynchus, and several marine zoölogical specimens have been of signal service in giving instruction in my department.

It gives me pleasure to state that many rare and valuable donations have been made to the Museum by Alumni of the College.

The Museum is again much crowded for room.

THE APIARY.

The experiment of wintering bees by burying them, did not result as favorably as it has in the past. Half of those buried were put into the ground in early October, the other half in early November. All were removed the first of April. One-half of each lot were dead. The bees of the lot which were buried in October that lived, came out the best of any in the Apiary.

One of our colonies that was given much unsealed honey had the dysentery very badly. All the others, except one in the cellar, and three out doors, which were packed in boxes, came through the winter in fine condition. The four, owing to a mistake the previous autumn, died of starvation. They had abundance of honey, but it was so scattered that the bees could not reach it during the long cold, and so perished.

SPRING DWINDLING.

During the spring I had the charge of some very weak colonies. These were kept confined to a very small space, by use of a division-board, so that they covered the combs at all times, were fed a litle daily, were kept covered by warm quilts, and by May 15th were strong colonies. I believe the above course is the sure preventive of spring dwindling.

Early in the season I invented a new feeder, the division-board feeder, which we have tried the season through and find it to be very admirable. This will be described and figured in the report of the secretary of the State Board of Agriculture for the current year.

We commenced the season with nine colonies. We have sold five colonies, and now have seventeen. We have taken about four hundred lbs. of extracted honey, and about fifty lbs. of comb honey. The season has been the poorest I ever knew. The white clover season was fair, since which time, owing to the drouth, the bees have hardly gathered enough for their own supplies. I have had to rely wholly upon student labor to aid in caring for the bees. This requires that I give my time, during both summer vacations, almost wholly to the apiary. The student who has assisted me the past summer, Mr. C. B. Charles, has been most faithful and efficient.

OTHER WORK.

I have acted as Superintendent of the College Sabbath School, which is under the auspices of the Christian Union for the entire year. During the past winter I took part in the Farmer's Institutes at Howell and Centreville, and gave aid to the local committee in arranging for the last mentioned meeting. At the December meeting of the State Pomological Society, I made a report as Entomologist of the association. I also wrote a paper for the February meeting of the same society. I gave an address before the State Bee Keepers' Associacion at their annual meeting at Grand Rapids. I have attended, helped to organize, and lectured before three district associations of bee keepers; one at Carson, one at Howell, and one at Lansing. All of these societies are large and active. I made an exhibit of apparatus belonging to the College Apiary, at all of these meetings.

The past winter, the first three editions of my Manual of the Apiary being exhausted, I partly revised and added an appendix of twenty-five pages for the fourth edition, which appeared in May.

The correspondence of my department continues to increase, and becomes more and more a weighty task. Several times the past summer, I have had over fifty letters of inquiry per week.

Respectfully submitted,

A. J. COOK,

Prof. of Entomology and Zoölogy, Curator of the Museum, and Apiarist.

REPORT OF THE PROFESSOR OF BOTANY AND HORTICULTURE.

To the President of the State Agricultural College:

The following is a brief report of the teaching and other work done in my department for the College year ending September 30, 1879:

My report has been so full for the last three years that it seems unnecessary to go much into detail except to notice some additions, improvements, or new experiments.

BOTANY.

During half of the autumn term the Seniors were daily engaged in vegetable physiology, making notes and drawings with the aid of compound microscopes. Some lectures were given, and some attention was paid to our best books on botany and on the microscope. The class numbered thirty-one, and for most of the time was divided into three sections on account of the small size of the room.

For nine weeks of the spring term and all of the summer term the members of the Freshman class had daily instruction in this subject. The lessons assigned were much like those so fully described in my former reports. The class was divided into two sections, each numbering a little over forty members. Written examinations were given with questions similar in character to those previously printed in my reports.

At the close of the second term each student presented a thesis on some topic which he had investigated. Each was told where or shown where to find specimens for study in the vegetable garden, wild garden, flower garden, or in the fields and waste places. To increase the interest in this work, credit was given for it equal to one-fifth of all the botany of the term. The theses were written on uniform paper with view to binding in a volume. I am much gratified with this part of the work. Some of the discoveries, so far as I know, were new to science, and nearly everything was new to the members of the class. The students enjoyed this and generally felt that they were doing good work in thus learning how to observe and experiment. As a child is pleased with the first steps it ventures to take, so a student feels that he is gaining power in making original investigations.

The topics given were such as follows:

"How do insects behave on a certain species of plant, and what kind of insects visit the plants?" "How are some certain plants fertilized by the wind?" "How do humming birds work on flowers, and on what species?" "How do some plants twine or climb?" "How do certain flowers change the size, length or shape of their parts as they develop to insure cross fertilization?" "What is the relative order of development of the stamens and pistils of many plants of Indian corn, and how many days do they vary?" "How does dodder behave as a parasite?" "Study cleistogamous flowers of a violet." "Study the shape of all parts of a flower of the common pea, from a small bud to a full-blown flower." "For what do ants visit plants, and how do they behave?"

LANDSCAPE GARDENING.

The usual time of half a term was occupied by the Seniors in this study. Some lectures were given, and some use was made of Kemp's text-book. Lists of trees and shrubs were made out and much was learned by studying the beautiful specimens which are found in great variety on the lawn and in the arboretum of the College.

HORTICULTURE.

On account of a change in time for this class, no instruction was given during the year which just now closes. For the manner of giving this instruction the reader is referred to my lecture at Farmers' Institutes. The lecture is printed in the last part of this volume.

HISTORY.

Again, and probably for the last time, it has fallen to my lot to teach the Freshman in History. The members of the class seemed interested in the subject. The class was divided into two sections, and recited in the autumn term, making use of Swinton's outlines.

EXPERIMENTS AND OTHER ITEMS.

For accounts of these, see my lecture given at the Farmers' Institutes. This lecture may be found in the back part of this volume.

Mr. F. A. Gulley, foreman of the Horticultural Department, has given some account of experiments with beets and strawberries.

Respectfully submitted,

W. J. BEAL,

Professor of Botany and Horticulture.

REPORT OF THE PROFESSOR OF AGRICULTURE.

To the President of the Michigan State Agricultural College:

The following report of the Department of Agriculture in our College is submitted for your approval.

It covers the current year ending August 31, 1879. The year opened with prosperity, although there were many changes noted in the manner of keeping the accounts of the department, which will be noticed in their place.

INSTRUCTION.

During the first term I was called upon to give instruction to the class in French. The class was large and was consequently divided into two sections, thus causing two hours of each forenoon to be devoted to class-room work.

The class did creditably, considering the amount of time I had to devote to their work.

The spring term was consumed in giving a course of lectures to the Freshmen class, nearly three weeks of the time being consumed in work in the yards studying the points of the various breeds of cattle owned on the farm. The class showed much interest in the course.

During the summer term I gave the Senior class a course of lectures somewhat similar to the one given to the Freshmen, and the additional work on stock-breeding and rotation of crops. The class numbered 22, and gave me their undivided attention from first to last.

INSTITUTES.

In the regular work of the Faculty I was assigned the Howell Institute to make arrangements for, and also to attend the one at Centreville. These I attended, and also the one at Charlotte, by request of Prof. Beal. I also attended an extra or local Institute at Hudson, and a Grange Institute at Mason, at all of which I lectured once and at several places twice.

In addition to this I have met with the Ingham Farmers Club, with the Marshall and De Witt Granges, and lectured several times before Capital Grange at Lansing, Mich. These latter were not required, but I have accepted from urgent invitation, and feeling that I ought in all places to work for the farmers of the State of Michigan, and for the good of the farmers' College.

EXPERIMENTS.

The experiments for this year, 1879, are only partly completed and the full results cannot be given. Those in relation to wheat, however, can be given in full. On account of the severe attacks of the Hessian fly during the spring of 1878 (see Report 1877 supplement), I sowed several plats of Clawson wheat with the same conditions surrounding them, as far as could be seen, except time of sowing, and the plats were watched for results of the work of the Hessian fly.

Plats were sown as follows, viz.: on Sept. 6th, 9th, 11th, 13th, 16th, 18th, 21st, 24th, 27th, 30th, and Oct. 2d and 5th.

On Oct. 22d these plats were visited by Prof. Cook and myself in company. A thorough search showed that larvæ of Hessian fly were deposited in every plat sown before Sept 24th, the number found in plats sown Sept. 18th and 21st being very few. In the field adjoining wheat sown Sept. 18th showed 1 to five larvæ in many stools. I also found larvæ in nearly all plats of different varieties of wheat sown adjacent to these plats sown at different dates.

On March 31st, I again visited these plats for the purpose of recording observations as to how these plats, sown at different dates, had stood the winter. At that time the plats sown Sept. 13th and 16th looked the best and seemed strongest and most vigorous. Next to these were those sown respectively on Sept. 18th and 6th and 9th. I might remark here that the two plats sown on the 6th and 9th came up at the same time on account of the excessive dryness of the soil on the 6th, and a subsequent warm shower on the 9th, just after the latter plat was sown.

The varieties that were sown this year were, Clawson, Deihl, Treadwell, Arnold's Gold Medal, Mich. Wick, Golden Straw, Tappahannock, Silver Chaff, Jennings White, Armstrong, Powers, Lincoln (badly mixed), Lancaster, Velvet Chaff, Kentucky, Louisiana, White Rogers, Hert's White, Post, Trump, Victoria, Rough Chaff, Australian (seed badly eaten by weevil), Asiatic, White Rose, Shaffer, Grecian White (failure), Buckeye, Amber, Shumaker, Fultz and Muskingum.

Red Wheats.

Red May, Mediterranean, Arnold's Hybrid, Nursery, Red Russian, Dott and Lammas.

Hybrids.

Armstrong and Lancaster, Deihl and Lancaster, Deihl and Amber, Armstrong and White Amber, Deihl and Egyptian Red, Deihl and Treadwell, Armstrong, Deihl and Treadwell, Clawson and Deihl (the latter cross-fertilized by direction of Prof. Beal in 1878), Asiatic and Gold Medal (cross-fertilized as above).

Of these single varieties several did well. I will mention particularly the Clawson, Deihl, Treadwell, Tappahannock, Silver Chaff, Jennings' White, and Arnold's Gold Medal, among the white wheats; the Fultz and Shumaker, of the amber varieties; Russian Red, Arnold's Hybrid and Mediteranean, among the red wheats. The hybrids all did fairly well; the cross between Deihl and Treadwell giving a nice plump wheat of fine appearance. Straw strong, and stood up well. The crosses with the Lancaster as one foundation seem to promise most uniformly good results. The Lancaster is of itself a good strong variety of wheat, a good yielder and a thrifty grower.

Heads of Wheat.

Three heads of wheat were sown with the grains in the same relative position as in the head, each grain being sown by itself and eight inches from its neighboring kernel. This was done in order to notice the difference of growth, yield, etc., of grains in different portions of the head.

The heads were harvested and the number produced by each grain carefully counted, their total length measured, the total grains produced estimated very closely by counting the ranks of kernels. The longest head measured and recorded, and in two of the heads the number of grains of wheat counted in the longest head produced by each stool of wheat. The following table of averages was obtained by taking the upper ¼, the lower ¼ and the middle ½ of the head as sown.

HEAD NO. 1.	Average No. Heads per Stool.	Average No. Grains per Stool.	Average Total Length of Head, ditto.	Av. Longest Head, ditto.	Average Grains Longest Heads.	Total of Green or Blasted Heads. No. Grains.
Upper ¼..........	3 13-14	240 13-14	14 11-56	4 13-56	48 6-7	7
Middle ½..........	6 ¼	248 21-22	23 65-176	4 83-176	52 ½	32
Lower ¼..........	7 5-19	296 16-19	26 27-38	4 15-19	54 7-19	24
HEAD NO. 2.						
Upper ¼..........	5 ½	193	18 13-16	4 9-16	....	11
Middle ½..........	5 7-16	231	25 85-128	4 29-64	....	13
Lower ¼..........	5 4-7	214 ½	24 ¾	4 37-56	....	8 ½
HEAD NO. 3.						
Upper ¼..........	6 4-9	288 ⅔	23 ½	4 7-36	42 ⅔	2
Middle ½..........	9 7-31	378 2-31	33 25-124	4 21 62	47 8-31	6
Lower ¼..........	9 ¼	354 5-7	32 55-56	4 11-14	54 3-7	10

SUPERPHOSPHATE ON WHEAT.

The following experiment was tried with superphospate on wheat, viz.: four acres were selected in the west central part of field No. 6, where the soil was very uniform, and No. 1 was sown to wheat with the fertilizer drilled in with the wheat at the rate of 200 lbs. per acre. No. 2 was sown with the superphosphate broadcast over the surface of the ground, but sown at the same time the wheat was drilled (the drill sowing both) and at the same rate. No 3 was sown to wheat without fertilizer, and No. 4 by its side. The following was the result of the experiment:

	Wheat, lbs.	Straw, lbs.	Total, lbs.
No. 1	1,631¾	2,272¼	3,904
No. 2	1,944½	2,545½	4,490
No. 3	1,953¾	1,702¼	3,656
No. 4	2,065¾	2,784¼	4,850

The plats dressed with the phosphates show quite a large increase of straw in proportion to wheat produced.

While this experiment did not produce flattering results, I believe it to be a good dressing and fertilizer for land that will not produce over 10 to 15 bushels per acre.

Many questions having been asked in Institutes and by correspondence in regard to the value of salt as a fertilizer, and especially as we have refuse salt from the Saginaw Valley almost at our doors, I resolved to try sowing salt on wheat in spring and note the result. I therefore selected a portion of field No. 6, east part, where several persons assured me no one could detect any variation by the eye on two or three acres of wheat. Eight plats of four square rods each were selected and staked out. These plats were in size as one to four in respect to breadth and length. On May 8 salt was sown on all the odd numbered plats at the rate of 200 lbs per acre. The weather was very dry and the fertilizer lay on the ground undissolved nearly 18 days before rain came to dissolve it; so I am not sure that best results were reached. The result was as follows:

	Wheat, lbs.	Straw, lbs.	Total, lbs.
No. 1	40½	71½	112
No. 2	40½	61½	102
No. 3	38	62	100
No. 4	39½	68½	108
No. 5	43½	71½	115
No. 6	38	57	95
No. 7	46	62	108
No. 8	39	85	124

I should hope to see this repeated with the amount of salt divided and one-half sown in fall, and the remainder in the early spring at least as soon as April 1. I hardly regard the test this season as a strictly fair one.

UPLAND RICE.

I have also sown a variety of rice known as upland rice on loamy soil to see how it would do in our climate. It has grown well thus far (Aug. 1st). The seed was sown May 9th and treated similar to spring wheat as was ordered in the printed directions. (Since badly dried up, Sept. 1st, 1879.)

PLASTER OR GYPSUM ON CORN.

The experiment with plaster as a fertilizer for corn was continued this year as a means of comparisom with the two preceding years. The plats this year were in field No. 9. As the season of growth is not passed the result cannot be published.

EXPERIMENTAL GRASSES.

Plat No. 1—Timothy (Phleum Pratense) and Foul Meadow (Poa Serotina)
Plat No. 2—Timothy and Blue Grass (Poa Prætensis).
Plat No. 3—Timothy and Orchard Grass (Dætylus Gloruerata).
Plat No. 4—Timothy and Red Top (Agrostis Vulgaris).

Of these plats Nos. 2 and 3 did the best. The season was a very dry one, and the Red Top and Foul Meadow did absolutely nothing worth the name on any part of the plats. The Orchard Grass did best on the loams and the Blue Grass on the drained muck bed and clay loam. Timothy grew in all places tolerably well. These should be observed in a moist or decidedly wet season in order to get at their value as grasses. It must be remembered that the clover and timothy on the same field gave only one-half the usual crop, and that for 6 successive weeks in April and May, we were without enough rain to wet down one-half an inch.

Later in the season the plats have done better, with frequent rains in July.

EXPERIMENTS IN BREEDING.

Last year the Hereford cow dropped a calf sired by the Short-horn bull Rufus, 18,275; he by 2d Duke of Oneida and out of Roan Duchess 3d. This calf carried the markings of the Hereford cattle (the white face and general appearance) with much of the disposition of the mother. This year the experiment was repeated and the result was almost identical. A heifer calf was dropped with the white face of the Hereford, etc., as before, and sired by the same bull.

This year the Hereford has been served by the Devon bull and her first cross-bred heifer by the young Short-Horn bull Gen. Custer, 29,618; he by the 23d Duke of Airdrie, 19,963, out of imported Georgia Hillhurst 3d, bred by Col. Kingscoli, Gloucestershire, and imported by B. B. Groom & Sons to Kentucky.

Next year will probably show the result of this years' breeding, and it will be watched with a great deal of interest for two reasons.

First, To see the result of the first and second impregnation on subsequent progeny; and

Second, To watch result of union of Devon and Hereford blood.

I have also experimented in the weighing of feed consumed, so as to see the ratio of pounds of feed consumed for 100 lbs. live weight in the different breeds, viz.: Short-horns, Ayrshires, Devons, Galloways, and Jerseys. I selected 8 Short-horns, 7 Ayrshires, 2 Devons, 2 Galloways, and only one Jersey as that was the only cow of the breed on the farm.

The result is given in the following table. The food was turnips, cornstalks, and straw, with a small grain ration somewhat proportioned to the size of the animal:

	Average lbs. consumed per day.	Average weight of Animals.	Average food per 100 lbs. live weight.	Average grain pts. per day.
Jersey	101 ¾	990	10.277	6
Devon	83 23-24	1195	7.025	4
Ayrshire	99 6-7	1116	8.947	5 4-7
Short-horn	105 ½	1208	8.719	6 ½
Galloway	102 ⅛	1153	8.857	7

This experiment was continued and gives the average for 24 days. This report must only be taken as an indication and not as a decisive result. It should be continued for some time and in different years and with a large number of animals, and in time might give some data of comparative value.

The first subsoiling done on the farm proper since my connection with the Farm Department was done this year in field No. 5. About three acres on the north side of the field were subsoiled at a depth of six inches below the bottom of the furrow, thus stirring the soil to a depth of 14 inches from the surface. The ground was planted to imperial sugar beets. The growth of the crop has been remarkable, and early in the season the place where the subsoiling was left off was distinctly marked by the difference in growth. That part was much better where the land was subsoiled. How the crop will carry out remains to be seen.

By request of the Farm Committee I herewith give a partial analysis and classification of the correspondence of the Farm Department, more particularly to show the calls for the various kinds or breeds of stock. The result is as follows: Inquiries in regard to Short-horns, 21; Ayrshires, 21; Devons, 5; Jerseys, 10; Galloways, 8; Holsteins, 3. Sheep—Cotswolds, 2; Southdowns, 9; Merinos, 4. Swine—Essex, 23; Suffolks, 2. Implements, 25; drainage, 5; pedigrees, 27; experiments, 9; exhibitions, 5; institutes, 16; reports, etc., 12; veterinary science, 2; fertilizers, 9; seeds, 39; crops, 5; buildings, 4; miscellaneous, 40.

Some cross-fertilizing of varieties of wheat has been done under direction of Prof. Beal.

The foregoing gives briefly the experiments and results on the College Farm during the year 1878–9.

C. L. INGERSOLL.

REPORT OF THE DEPARTMENT OF MATHEMATICS AND ENGINEERING.

To President Abbot:

I have the pleasure of submitting the following report of the Department of Mathematics and Civil Engineering, for the year ending August 31st, 1879.

CLASS INSTRUCTION.

With the present arrangement of studies, each class in the College has at some time during the year, one or more studies in my charge.

I teach to the Seniors, Civil Engineering, Drawing and Astronomy; to the Juniors, Mechanical Physics; to the Sophomores, Mechanics, Surveying, and Trigonometry; to the Freshmen, Algebra, and Geometry. The past year, owing to the absence of a Junior class for two terms, there has been no class in Drawing.

The number of hours devoted to instruction in the class-room has averaged 3½ each day, this however is only a fraction of the actual time used in preparation for class instruction. Besides the class instruction, much time of necessity has been given to those operations of practical engineering which have been in my charge.

The number of students that received instruction in my classes has been as follows:

Civil Engineering	32
Astronomy	27
Algebra (first term)	67
Algebra (second term)	75
Geometry (first term)	63
Trigonometry	62
Surveying	61
Mechanics (one division)	22

The course of instruction has been the past year, except for the study of Mechanics, the same as for the year ending August 31st, 1878, and as described in my report for that year. In Mechanics, Peck's work was substituted for that of Olmstead. The class completed the text-book, and in addition had a short course of lectures on optics and acoustics.

In addition to the class instruction the following operations in Practical Engineering were in my charge.

SURVEYING.

In field No. 4, drains sufficient for thorough drainage, have been located and surveyed.

For the purpose of draining the area embraced in fields Nos. 12, 13, 14, 15 and 16, a main drain to be constructed of 8-inch tile, has been located and surveyed. This drain terminates in the Red Cedar River, and crosses fields, No. 6, No. 8 and No. 10. To locate this drain required extensive surveys of the whole area to be drained, and also of the territory lying between this area and the river. Although the route chosen presents many difficulties of construction, it is believed to be the most favorable route possible. The main drain commences in a silt basin in the northwest portion of field No. 12, with a depth of 4 feet. The average depth of the main drain from the silt basin in No. 12, to the river is 5.24 feet, the greatest depth is 7.57 feet, the least depth 3.34 feet. The fall is uniformly that of 26-100 feet per 100 feet from the silt basin in field No. 12 to the north part of field No. 6; from thence it descends with a fall of 66-100 feet per 100 feet, which is maintained a distance of 350 feet. The descent for the remainder of the drain is 3.26 feet per 100. The whole length of the main, or 8-inch drain, is 2,550 feet. Quick sand exists near the bottom of the drain in field No. 6 and in a portion of field No. 8. Mr. McDowell and myself designed and had constructed, of iron, an apparatus which constitutes in effect a movable curb. In the portion of the drain now constructed, most of which is through sand saturated with water, the use of this apparatus has proved very successful, and enabled the tile laying to go on continuously. The east line of the farm north of field No. 6 has been surveyed and marked with permanent monuments.

ICE HOUSE.

By a resolution of the Board the construction of the College ice house was put in my charge. The building was located near the dam, and set on a foundation of square posts sunk into the ground about 5 feet. The building is 30 feet north and south, 20 feet east and west, and has a height of 14 feet to the plates. Its capacity when well filled is nearly 200 tons. Each wall of the building is sheeted both inside and out, and so constructed as to leave a space between the inner and outer sheeting, one foot wide. This space is filled with saw-dust. The roof is of dressed lumber and has a one-third pitch. The building is constructed so that it can be covered with planed siding which may be painted.

An inclined plane with a run-way for ice and a walk for a man was built from the river to the building. The whole cost, including the filling with sawdust and the inclined plane, was $139.38.

LIBRARY AND MUSEUM CASES.

The State Board of Auditors gave notice that the cases formerly used in the old State Library might be obtained for the College by simply removing them.

About 100 cases were obtained from the old State Library and reërected in various places at the College.

The total cost of removal and reërecting was $60.14.

This cost was distributed as follows:

Library cases	$26 64
Model Museum cases	13 03
Laboratory	5 01
Secretary's office	6 16
President's office	5 73
Stored in basement	3 57

DAM ON CEDAR RIVER.

The dam on Cedar river, back of Wells' Hall, has been finished, and the balance of the special appropriation for this purpose has been expended.

NEW INSTRUMENTS.

The board authorized the expenditure of one-half the special appropriation of $1,060, made to this department by the Legislature of 1878–9. With the approval of President Abbot the following instruments were purchased: An astronomical telescope with 5-inch object glass of Alvin Clark & Sons, $450. A sextant, provided with artificial horizon, of Fauth & Co., Washington, $100. A stereopticon, with 110 views, of Milligan & Co., Philadelphia, $100. Philosophical charts and key to the same of Andrews & Co., Chicago, $14. The instruments add much to the value of the instruction given by this department. Their usefulness would however be much increased could the department have a class-room for its exclusive use. Very respectfully,

R. C. CARPENTER.

REPORT OF THE HORTICULTURAL DEPARTMENT.

August 31st, 1879.

To the President of the Agricultural College:

I herewith submit the report of the work of the department for the year just closed.

All of our work being more or less experimental, we make no apology because the orchards, gardens, etc., do not return a profit. Instead of growing one or two of the most profitable kinds of strawberries, we have 70 varieties, requiring at least five times the labor that it would to grow an equal area of one kind. The same is true of the orchards and gardens.

The old vegetable garden near the professors' houses has been graded and seeded for a lawn, except the plats of strawberries, and they will be moved next season. The vegetables were planted in what was field No. 1 of the farm. This field, containing about five acres, is being fitted for a permanent garden. It was uneven, only partially drained, and somewhat stony. It was thought best to get it into good shape as soon as possible, therefore it has been graded, stones cleared off, subsoiled, a part of it well manured, tile drained, and the remainder sowed to green crops and plowed under. As was to be expected, the crops for the year have been only medium, yet sufficient to supply the boarding hall and houses on the grounds. After working this piece of land one more year we expect to make the vegetable garden a source of profit to the department, if the experimental crops are not included.

The farm lane fences that formerly separated the College lawns and orchard, have been removed, and the whole front of the College, about 90 acres, thrown into one enclosure which contains all the College buildings, lawns, orchards, gardens, experimental plats, &c. Carriage drives have been laid out so that visitors may drive to any part of the grounds to inspect the work of the department. The removal of the fences has added greatly to the apparent extent and beauty of the place.

During the last fall and spring terms we set out two rows of American Elms along the road in front of the College. The rows are 16 feet apart, and the trees were planted every 40 feet, one row alternating with the other, forming an unbroken double row of trees one mile long, containing 282 trees. They were mulched with sawdust, and only five of the entire lot died during the year.

A new board fence has been built from the north entrance to the east side of the farm, and the grading of the sidewalk completed. The walk extends the whole distance, one mile, and will in time be completely covered by the branches of the trees. This will add very much to the attractions of the College grounds.

STUDENTS' LABOR.

The students assigned to the department have labored 1,699½ days at a cost of $1,353.52. The highest rate of wages paid has been eighty (80) cents per day of ten hours. Of this labor 821 7-10 days was outside of the department, for which we have credit. The account is as follows:

821 7-10 days outside of department @ .80	$657 36
825 5-10 days in department @ .80	660 40
52 3-10 days in department @ .685 +	35 76
1,699½ days' labor	$1,353 52

The 877 8-10 days labor cost $696.16, and has been charged as follows:

Vegetable garden	$125 10
Apple orchard	127 68
Pear "	18 96
Green-house and flower beds	110 92
Nursery	35 92
Vineyards	33 24
Strawberries	47 88
Raspberries	14 32
Vegetable garden (permanent improvement)	17 76
Experimental plats of potatoes	12 52
Experimental plats of corn	22 56
Tools (care of, repairs)	45 20
Office (copying)	40
Compost	24 00
Experiments	11 92
Hot beds	11 84
Team	3 88
Drains	30 56
Miscellaneous	1 40
	$696 16

MEN AND TEAM ACCOUNT.

To inventory of horses, harness, and feed on hand Aug. 31, 1878	$486 25	
feed and bedding for the year	314 37	
paid for horse	100 00	
labor bills of men	218 00	
board of men	131 07	
By inventory of horses, harness, and feed on hand Aug. 31, 1879		$494 00
amount received for labor outside of department		375 00
labor charged to department		407 38
received for horse sold		45 00
received for feed sold		68 02
To amount to balance	139 71	
	$1,389 40	$1,389 40

The men and team labor has been charged to the department as follows:

Vegetable garden	$23 06
New vegetable garden (permanent improvements)	45 73
Apple orchard	24 45
Pear orchard	18 73
Greenhouse and Flower Garden	32 50
Nursery	3 70
Vineyard	3 80
Strawberries	4 67
Raspberries	8 20
Experimental plats of corn	12 70
Experimental plats of potatoes	9 62
Compost	197 51
Team	17 36
Drains	4 35
Miscellaneous	1 00
	$407 38

VEGETABLE GARDEN.

To inventory of vegetables in garden Aug. 31st, 1878	200 00	
labor for the year	148 16	
134 loads manure @ 75 cts	100 50	
By inventory of vegetables on the ground Aug. 31, 1879		100 00
received for vegetables sold		291 39
one-half of the cost of manure charged to permanent improvements		50 25
By balance		7 02
	$448 66	$448 66

As this is the first year the garden has received a liberal dressing of manure but one-half was charged to the present crop. Some of the work was occasioned by the experiments in growing beets and turnips, and of course made no returns for labor expended.

NOTES ON STRAWBERRIES.

The first to ripen was the Metcalf, June 9th, a small, soft, poor flavored berry; Matilda, the 10th, fair size, good flavor, good for family or near market, too soft to ship. Duncan began to ripen June 11th, good size, quality, and flavor; berries all ripen in three or four days. This is the best and most productive early berry on our grounds.

Monarch of the West, Col. Cheney, Black Defiance, Cumberland Triumph, Champion, Hervey Davis, Capt. Jack, and several others had ripe berries on the 14th; Cowing's Seedling, Russell, Glendale, Afrique, and others on the 16th.

The Col. Cheney is one of the largest and most productive berries, with us. It is a little soft to ship, but for the family or near market is very desirable.

The most promising of the new berries on our grounds is the Champion, both for market and for home use; as we had but a few hills in bearing we cannot speak fully as to its merits till it has fruited another season. This berry is large, nearly round, bright crimson in color, excellent flavor and texture, hard enough to ship, and does not lose its fine appearance after being picked some time. It is very productive, the season lasts over a week, and the berries hold their size to the last picking.

We would recommend the Black Defiance, for family use, to those who like a solid-fleshed aromatic-flavored berry. It is one of the largest, dark crimson in color, a little seedy, but otherwise very fine for a dessert berry; for our own eating we prefer it to any variety we have. Unfortunately it is a shy bearer, and for this reason alone will not be of value for market.

Capt. Jack was productive, medium size, long season, but the berries lose their size towards the last; it is rather soft for shipping.

Afrique, exceedingly productive in the number of berries, very dark color, fine flavor, but too small and soft for a market berry.

Hervey Davis, one of the new berries, is bright scarlet, fair size, fine quality, a medium bearer, and one of the best to keep after being picked.

The strawberries are planted on light soil that is not very rich. We are starting new beds on a variety of soils, and purpose growing all of the kinds that are of value, so that students and visitors may examine and become familiar with them. We exhibited 30 varieties of berries at the June meeting of the State Pomological, and will probably show all we have at the summer meeting next year.

NOTES ON ROOTS.

Last spring we procured seed of as many varieties of beets and turnips as we could get, of those suitable for stock feeding.

A strip of the best ground in the new garden was manured at the rate of 40 loads of composted manure to the acre, plowed, subsoiled, thoroughly harrowed and made fine, and the beet seed sowed with a hand drill in rows thirty inches apart on the 8th of May, the turnip seed in June in the same way.

The roots were thinned to about one foot apart after getting well started, and thoroughly cultivated during the season. The soil, which is a heavy gravelly loam, did not seem so well adapted to turnips as to beets, and the hot dry weather of the summer and early fall did not produce a good growth, and some of the turnips commenced rotting before they were harvested.

The varieties grown were sowed in rows 148 feet long, one and two rows of a kind. The yield per acre is given below.

Turnips.	Bushels.
Yellow Aberdeen	561
Yellow Globe	643
Yellow Swedish	626
Orange Jelly	221
Rosbon's Golden Ball	683
Yellow Stone	584
Laing's Swede	540
White Rutabaga	350
Skirving's Swede	569

An average yield of 528.554+ bushels per acre.

NOTE.—The Report of 1879 not being published till the spring of 1880, it was thought best to give the results of experiment in root growing in the present number.

Beets.	Bushels.
Harris' Improved Yellow Globe	1,104
Worden's Orange Globe	873
Yellow Globe	1,014
Red Tankard	381
Norbiton	1,107
White Sugar	1,414
Lane's Improved Sugar	861
Velmorin's Sugar	798
Maine Sugar*	1,255
Red Globe	1,026
Yellow Intermediate	1,026
Long Yellow	1,140
Improved Mammoth	1,140
Golden Tankard	581
Long Red	1,596

An average yield of 1,021 bushels to the acre, or taking the ten highest, an average yield of 1,182 bushels per acre.

The roots were carefully measured in bushel baskets, well rounded up, some of the beets holding so much more dirt than others, that they could not be weighed accurately without washing.

The sugar beets have very many fibers or roots and grow almost entirely in the ground. Some of them could not be pulled with a heavy potato hook and had to be spaded out, the white sugar being the hardest to dig. The other beets grow mostly above ground; the Harris and Yellow Globe could be pushed over with the foot. We would estimate the cost of harvesting the sugar beets to be at least twice that of the others. The Long Red, which gave the greatest yield, grows long and crooked. Many of the beets were 30 inches in length. They are tender and break easily and will not probably keep well. The Harris Improved is round, hard as a rutabaga, and will probably be a good keeper. It is easy to harvest and very desirable for general culture. Five bushels of each variety were buried to test their keeping qualities. The yield was good, but we think can be increased in our garden after it has been brought into a better state of cultivation. This one trial is of course not decisive as to the comparative yielding qualities of these varieties; the experiment should be repeated several times and on different soils to decide anything of value.

CORN CULTIVATION.

A series of experiments in testing the effect of root pruning, and different ways of cultivating corn, were commenced last year. The corn plats planted for the same purpose this year were so infested by meadow moles that the experiment was given up for this season. Last year a part, seven plats of corn, some manured and some not, were root pruned from one to five times during the season, the remainder of each plat being cultivated in the ordinary way. The pruning was done by attaching a knife to the side of a five-tooth one-horse cultivator, standing upright and cutting about eight inches deep. The cultivator was run about four inches from the row pruned, on either side cutting off all the side roots. When harvested the corn on the pruned and unpruned part of each plat was carefully weighed, and the unpruned part of the plats in each instance gave the largest yield, varying from a small proportion to 30 per cent, the root pruned corn on the well manured plats giving the largest proportionate yield.

---

* The Maine Sugar beet was grown from imported seed, but is the same variety that is grown in Maine for sugar.

We do not regard the experiment for one year of sufficient value to give the account in full. We expect to continue it, not only the root pruning, but testing the effect of deep and shallow, early and late cultivating, also the effect of continual working of the soil as compared with barely enough to keep down weeds.

F. A. GULLEY, *Foreman.*

DONATIONS

TO THE COLLEGE DURING THE YEAR ENDING AUGUST 31, 1879.

From COMMISSIONER OF AGRICULTURE, UNITED STATES:
  Annual Report, 1878.
  Speech of Hon. H. G. Davis.
  Speech of Hon. A. S. Paddock.
  Manual of Instruction in Silk Culture.
  Sheep Husbandry in the United States.
  Report on Crops and Live Stock, April, 1879.
  Crop Reports, June, July, 1879.
  Circular letter upon Manufacture of Maize and Sorghum Sugar, 1879.
  List of Agricultural Societies and Farmers' Clubs, 1876.
From CHIEF ENGINEER'S OFFICE, U. S. A.:
  Five maps of Atlanta campaign.
  Report, 1878, Parts I., II., III.
  Use of Barometer on Surveys.
  Specimens from borings between the Mississippi and Lake Bourne.
From CHIEF SIGNAL OFFICER, U. S. A.:
  Report, 1878.
From CHIEF OF ORDNANCE, U. S. A.:
  Report, 1878.
From U. S. NAVAL OBSERVATORY:
  Astronomical and Meteorological Observations, 1875.
  Results of Observations, 1853-60 (2 copies).
  Meteorological Observations, 1872, 1873.
  Report on Site of Naval Observatory.
  Washington Catalogue of Stars, 1845-71.
  Washington Mural Zones, 1846-9.
  Washington Meridian Circle Zones, 1846-9.
  Washington Transit Zones, 1846-9.
  Reduction Tables for Transit Observations.
  Catalogue of 1963 Southern Stars.
  Equational Fundamental Stars.
  Uranian and Neptunian Systems.
  Corrections to Hansen's Tables of the Moon.
  Difference of Longitude between Washington and Ogden, Utah.
  Difference of Longitude between Washington and St. Louis, Mo.
  Difference in Longitude between Washington and Detroit, Mich.
  Meteorological Observations, 1876.

From NAUTICAL ALMANAC OFFICE, U. S. N.:
American Ephemeris and Nautical Almanac, 1881.
From DEPARTMENT OF INTERIOR, U. S.:
Bibliography of N. A. Invertebrate Paleontology.
Bulletin of U. S. Geological Survey of the Territories, Vol. IV., Nos. 3 and 4; Vol. V., No. 1.
Bulletin of U. S. National Museum, No. 12.
Report of Survey of Rocky Mountain Region. Powell.
Preliminary Report of Field Work of survey of Territories, 1877, 1878. Hayden.
Report of Yellowstone Park, 1877, 1878. Norris.
Report of Methods of Surveying the Public Domain, 1878. Powell.
Chart of Geological Time. Powell.
Birds of Colorado Valley. Coves.
From SMITHSONIAN INSTITUTION:
Annual Report, 1877 (2 copies).
Miscellaneous Collections, Vols. XIII., XIV., and XV.
K. Norke Universite.
From BUREAU OF EDUCATION, U. S.:
Circular No. 1, 1878.
From PATENT OFFICE, U. S.:
Official Gazette to Dec. 31, 1878.
From TREASURY DEPARTMENT, U. S.:
Report of Lighthouse Board, 1878.
From COMPTROLLER OF THE CURRENCY, U. S.:
Annual Report, 1878.
From CHIEF OF BUREAU OF STATISTICS, U. S.:
Commerce and Navigation. Part II., 1878.
Quarterly Reports of Statistics.
From SECRETARY OF STATE, Michigan:
Joint Documents, 1877. Vols. 1, 2, 3.
Second Annual Report of Cereal Products of Michigan, 1877–8.
Compiled Laws, 1871. Vol. II.
Legislative Manual, 1879.
Public Acts of Immediate Effect, 1879.
From STATE LIBRARIAN, Michigan:
Biennial Report, 1877–'78.
U. S. Statutes at Large, 2 Session, 45th Congress, 1877–8.
Michigan Court Reports. Vol. 37.
From AUDITOR GENERAL, Michigan:
Report, 1878.
From COMMISSIONER OF RAILROADS, Michigan:
Annual Report, 1877.
From SUPERINTENDENT OF PUBLIC INSTRUCTION, Michigan:
Outline of Institute work, 1879–80.
From SUPERINTENDENT OF THE ASYLUM FOR DEAF, DUMB, AND BLIND, Michigan:
Annual Report, 1878.
From STATE BOARD OF HEALTH, Michigan:
Annual Report, 1878.

From SECRETARY OF STATE BOARD OF AGRICULTURE, Michigan:
  Agricultural of Massachusetts, 1875–6, 1876–7, 1877–8, 1878–9.
  Report of Department of Agriculture, Illinois. Vol. 15.
  Report of Connecticut State Board of Agriculture.
From SECRETARY OF STATE POMOLOGICAL SOCIETY, Michigan:
  Annual Report, 1878. (2 copies.)
From HON. M. S. BREWER, M. C.:
  Commercial Relations, 1877.
  Congressional Record, 45th Congress, 2d Session. Vols. 1–5 and index.
  Statements before Committee on Coinage, Weights and Measures.
  Report of Commissioner of Agriculture, 1877.
  Report of Bureau of Statistics on Internal Commerce and Transportation, 1876.
  Message and Documents, Department of State, 1878–9.
  Commerce and Navigation. Part II., 1878.
  Arguments before Committee of Senate and House of Representatives on Patents, 1878.
From Hon. J. H. MCGOWAN, M. C.:
  Annual Report of Chief of Bureau of Statistics on Commerce and Navigation, 1878.
From ILLINOIS INDUSTRIAL UNIVERSITY:
  Report VIII., 1875–6, 1877–8.
From MASSACHUSETTS HORTICULTURAL SOCIETY:
  Schedule of Prizes, 1879.
  Transactions, 1878. Part II.
From CONNECTICUT EXPERIMENT STATION:
  Annual Report, 1878.
From SHEFFIELD SCIENTIFIC SCHOOL:
  Annual Report, 1878.
From HARVARD COLLEGE:
  Annual Report, 1878.
From MASSACHUSETTS AGRICULTURAL COLLEGE:
  Annual Report, 1878.
From EAST TENNESSEE UNIVERSITY:
  Annual Report, 1878.
From UNIVERSITY of Missouri:
  Report of Curators, 1878.
  Report of Agricultural College, 1878.
From COMMISSIONERS OF SECOND GEOLOGICAL SURVEY of Pennsylvania:
  Report. Vols. DD, E, F, G, HHHH, KKK, N, O, Q.
From PROF. N. H. WINCHELL, STATE GEOLOGIST, Minnesota:
  Sixth Annual Report, 1877.
From HON. J. W. HOYT, Governor of Wyoming Territory:
  Report to Secretary of Interior, 1878.
From COMMISSIONER OF AGRICULTURE, Georgia:
  Farmers' Scientific Manual.
  Report, 1878.
  Soil Tests of Fertilizers, 1878.
  Crop Reports, July, 1879.
From SECRETARY OF STATE BOARD OF AGRICULTURE, Kansas:
  First Biennial Reports, 1877–8.
  Monthly Reports.

From Librarian of Parliament, of Quebec.
Sessional Papers, 1 to 30. Vol. 10, 1876.
Journal of Assembly. Vol. XI, 1877–8, 1878.
Journal of Legislative Council, 1877, 1878.
From Secretary of Montreal Horticultural Society:
Third Report, 1877.
From Accodemio D' Agricultura, Arti e Commercio dei Verona.
Memorie. Vol. LVI., Series 11.
From Iota Chapter, Michigan, Delta Tau Delta Fraternity:
Catalogue of the Fraternity, 1879.
From. Pres. T. C. Abbot, College:
Address of Pres. J. B. Angell at the Annual Commencement of Michigan University, 1879.
From Prof. R. C. Carpenter, College:
Transportation of Agricultural Products, address at Farmers' Institutes, 1879.
From Prof. R. C. Kedzie, College:
Report of State Board of Health, Michigan, 1877.
From Mrs. Mary J. C. Merrell, Lansing:
National Live-stock Journal. Vols. I.–VI., bound in fine.
From S. D. Bingham, P. M., Lansing:
Report of Entomological Commission on Rocky Mountain Locust.
From Signor J. A. Albuquerque, Secretaire:
Annvaris da Academia Polytechnica da Porto, 1877–8.
From H. W. Howgate, U. S. A.:
Polar Colonization.
From the author, Hon. H. C. Hodge, State Senator, 1879.
Arizona as it Is.
From Geo. P. Rowell & Co., New York:
American Newspaper Directory, 1879.
From Prof G. T. Fairchild, College:
Robinson's University Algebra.
Robinson's Geometry.
Davies' Legendre.
Davies' University Arithmetic.
Thompson's Higher Arithmetic.
From the following Colleges, their annual catalogue for 1878–9:
Purdue University, Indiana.
Berea College, Kentucky.
Worcester Free Institute.
Lafayette College, Pennsylvania.
North Carolina University.
East Tennessee University.
Missouri University.
Maryland Agricultural College.
Antioch College, Ohio.
Arkansas Industrial University.
Yale College, Connecticut.
Oberlin College, Ohio.
Hampton Normal and Agricultural College.
University of California.

University of Louisiana.
West Point Military Academy.
Rochester University.
Virginia Agricultural College.

From PUBLISHERS, the following periodicals and newspapers:

American Farmer.
Michigan Farmer.
New England Farmer.
Practical Farmer.
Prairie Farmer.
Scientific Farmer.
American Rural Home.
Michigan Homestead.
Grange Visitor.
The Husbandman.
Western Rural.
Farmers' Review.
Farm and Fireside.
Western Stock Journal.
Valley Home and Farm, Colorado.
Foothill Weekly Tidings, California.
Canada Globe and Farmer.
Bee-keepers' Magazine.
Gleanings in Bee-culture.
Boston Journal of Chemistry.
American Missionary.
Brown's Phonographic Monthly.
Church Union.
Deaf-mute Mirror.
Essex Institute Bulletin.
Allegan Journal.
Battle Creek Journal.
Charlotte Republican.
Clinton County Republican.
Coldwater Republican, semi-weekly.
Flint Globe.
Flint Wolverine Citizen.
Grand Rapids Times.
Grand Rapids Saturday Evening Post.
Hillsdale Standard.
Ingham County News.
Kalamazoo Telegraph.
Lansing Journal.
Lansing Republican, semi-weekly.
Midland Independent.
Monroe Commercial.
Newaygo Tribune.
Niles Mirror.
Pontiac Bill Poster.
Romeo Observer.
Traverse Bay Eagle.
Ypsilanti Commercial.

Through the AMERICAN UNITARIAN ASSOCIATION:
 Religious Magazine and Unitarian Review.
 Christian Register.
From PRESIDENT ABBOT:
 The Independent.
 New York Evening Post, part of the year.
From PROF. FAIRCHILD:
 Harper's Weekly.
 The Advance.
 Literary World.
 Oberlin Review.
From PROF. COOK:
 Rural New Yorker, 1879.
From PROF. BEAL:
 American Cultivator.
From PROF. CARPENTER:
 Detroit Daily Free Press.
 Educational Weekly.
 Book Exchange Monthly.
From PROF. INGERSOLL:
 National Live Stock Journal.
 New Orleans Times.
 Farmers' Home Journal, Louisville.
From MR. FRANK BENTON:
 Familien Blatter, 1879.
From MR. L F. CARPENTER:
 Bay City Courier, 1879.
From PUBLISHERS AND OTHERS:
 Occasional numbers of sundry periodicals.

DONATIONS TO MUSEUM, 1879.

Indian axe. A. C. Redding.
Chert arrow-head. A. C. Redding.
Jasper arrow-head. Isaac W. Clifton.
Iron jack-knife. J. T. Huston.
Blind worm (*Anguis fragilis*). C. C. Georgeson.
Hogs' foot, double. A. Burch.
Cells of tailor bee. A. H. Osband.
Birch bark. Irwin Smith.
Peacock's eggs. N. Goodnoe.
Indian totem. John Swift.
Indian spear. " "
Indian pipe. Robert Kennedy.
Chain coral. Edgar Wetherbee.
Menobranchus maculatus. A. J. Cook.
Lamprey eel. R. M. Slocum.
Horned toad (lizard). J. Fisher.
Amphioxi (5 specimens). B. Wilder.
Crocodilus lucius. O. A. Jenison.
Lamprey eel. Rodney Abbot.
Undeveloped frog. E. Langley.
Menabranchus maculatus. O. A. Jenison, Jr.

Salmon (*salmo salar*) two specimens. Mr. P. B. Tuttle.
Entœnia sertalis. P. B. Tuttle.
Storeria Dekayi. J. L. Howard.
Tropidonatus liberis. C. Strang.
Entania lertalis. A. J. Cook.
Siopeltis vernalis (two specimens). J. D. Thomas.
Tropidonotus lipedon. A. J. Cook.
Entœnia saurita. A. J. Cook.
Tropidonotus leberis. A. J. Cook.
Tropidoclonium Kirtlandi. A. J. Cook.
Tropidonotus lipedon. A. J. Cook.
Copper rock. J. K. Gailey.
Copper ore. " "
Indian hammers (75 specimens). J. K. Gailey.
Indian shovel (model). J. K. Gailey.
Indian shovel (fragments). J. K. Gailey.
Charcoal from copper mine. " "
Indian buckskin from copper mine. J. K. Gailey.
Ligillaria (3 specimens). G. W. Mitchell.
Favosites (2 specimens). " "
Head of crinoid. G. W. Mitchell.
Gypsum and selenite. G. W. Mitchell.
Chert arrow-head (6 specimens). G. W. Mitchell.
Indian axe. G. W. Mitchell.
Arrow-head. A. J. Cook.
Arrow-head. C. A. Dockstader,
Arrow-head. F. C. Skeels.
Ball of hair from cow's stomach. Mr. Dewey.
Geodes (complete suite). O. Clute.
Calcareous spar. A. J. Cook.
Zinc ore (blende), black jack. A. J. Cook.
Galena (lead ore). A. J. Cook.
Iron pyrites. A. J. Cook.

A. J. COOK, *Curator.*

DONATIONS TO HORTICULTURAL DEPARTMENT.

From BOTANIC GARDENS, Harvard University, Mass.:

Greenhouse Plants.—Aloe glabra, Aloe altilinea, Aloe foliolosa, Aloe fasciata, Aloe subtortuosa, Aloe bullulata, Aloe brachyphylla, Aloe sp. affin matracformis, Aloe nigrocans, Aloe minima, Agave schelegera, Agave deserta, Agave Shaweii, Agave Ptahensis, Agave vivipara, Agave ensifera, Agave xalapensis, Agave densiflora, Cereus Bonplandii, Cereus tyrnia, Cereus subrependus, Cotyledon Bamosissima, Cotyledon pulverulentun, Crassula lactea, Echinopsis Egredsii, Echinopsis multiplex, Echinopsis Virginiana, Echinopsis turpinata, Echinocactus Eyriesii, Epiphyllum truncatum, Epiphyllum pallidum, Echinocereus Epsenbergii, Huernia Tonquinanum, Mammillaria gladiata var. deflexpina, Mammillaria patila var. palidor, Mammillaria, flababicans, Mammillarea gladiata, Mammillaria Fosteri var. diversa, Mammillaria Rochii, Mammillaria neumoneana, Mammillaria divergens, Mammillaria Guilleminiana, Opuntia tomentosa, Opuntia polyantha, Opuntia vulgaris, Opuntia Biglonii, Opuntia dessecta, Phyllocactus phylanthus, Phyllocactus Anguleii, Pphyllocactus atophorus, Rhipsalis Cassytha, Sempuvivum globiferum, Stafelia gemmiflora, 2 Areca rubra, Acacia catehai, 2 Acacia ornithophora, 2 Amaryllis formosisima, Bambosa arundinacea, 2 Bignonia stans, Bromelia sparacelata, Bromelia Karatas, 4 Corypha Australis, Citrus buxifolia, Clematis Buchananiana, Cistus incanus, Crinum Americanum, Clerodendron splendens, Crinum sp. (West Indies), 2 Chorozema varia var. nova, Chinia (Japan), Dahlia variabilis, Dahlia Cerbantisii, 3 Dallurgea frondoso, Dolechos uniflora, Dracunculus canariensis, 2 Epacris paludosa, Ficus Cunninghami, 2 Ficus ferruginea, Ficus Indica, 2 Gloxinea species, Gossypium (Nan king), Hibiscus Californica, Hibiscus Millitaris, Humea elegans, Jacobinea Ghiesbreghtiana, Kentia Wendlandiaina, Knappia McOwenii, Livingstonia chinensis, Livingstonia subglobasa, Leucaphyton species, Libertia grandiflora, Laydenbergia dichotoma, Megarchiza Oregona, Ornithogalum altisum, Pitcairnia xanthocalyx, Pitcairnia tylifolia, Pitcairnia longifolia, Pitcairnia lepidata, Pitcairnia latifolia, Pitcairnia flavescens var. inodora, Pitcairnia species, Pitcairnia ramosa var. integrifolia, 2 Phœnix rupesola, Pardanthus chinensis, Primula purpurata vera, Potentilla atrosanguinea, 2 Puya crastata, Plychosperma alenandrae, Schizaphragma Hydrangeroides, 2 Schotia speciosa, Sterculea tricasephora, Symphicandra Wagnerii, 4 Yucca angustifolia.

Hardy Plants—Ampelopis Veichii, Corydalis aurea, Crawfordia (Japan), Hibiscus Moschentos Populus Monolifera var. Fremonti, Populus angustifolia, Mikania scandens, Petandra virginica, Rubia cordifolia, Silene Pensylvanica, Orontium aquaticum, Amaryllis tellaur, Amaryllis fonnosissima,

From H. Collins, White Pigeon, Mich.:

Seedling gooseberry plants.

From E. Le Valley, Ionia, Mich.:

Six Wisconsin weeping willows.

Six golden willows.

From Bussey Institute, Jamaica Plain, Mass.:

Silphium perfoliatum, Polymnia uvedalea, Silphium lacinatum, Carex rigida var. Bigloi, Tradescantia virginica, Tradescantia pilosa, Lythrum Salicaria, Arum Ialicum, Veratum viride, Trantnetteria palmata, Silphium terebinthaceum, Carex aristata, Potentilla tridentata, Orontium variegatum, Tiarella cordifolia, Stylophorum diphyllum, Agrostis canina var. Alpina, Cinna arundinacea, Houstonia purpurea var. longifolia, Carex ebusne.

From U. S. Agricultural Department, Washington, D. C.:

Seeds of Japan Trees—Hovenia dulcis (prob. a hedge plant), Kahia (Persimmon), Sugar Cryptomaria (japonica), Keyaki (Planera cuspidata), Maki (Sciadopitys verticillata), Shikiki (Illicium religiosum or Anise seed).

From Bussy Institute, Jamaica Plain, Mass:

Greenhouse Plants—Blechnum longifolium, Blechnum Pattersonii, Blechnum gracile, Blechnum Lomariaoides, Blechnum nudum, Lomaria nobilis, Acrostichum dimorphum, Gymnogramma tartarea, Gymnogramma Wettenhalleana, Gymnogramma pernviana, Asplenium Brownii, Adiantum patens, Aspidium Seebaldii, Aspidium membranaceum, Aspidium polymorphum, Aspidium elongatum, Aspidium Kaulfusii, Nephrodium polymorphum var. splendens, Brunsfelsia nitida, Eranthemum pulchellum, Pteris repandula, Pteris sulcata, Pteris semipinnata, Carex testacea, Phamra corymbosa, Gillenia oronopifolia, Sambucus anthocarfus, Scuttelaria Mocciona, Adhatoda beviscea, Musomvina Douglasi, Callicarpa cana, Divallia divaricata, Divalia Species. Piper excellium, Peristia spectrum, Polypodium spectrum, Polypodium limare, Polypodium sp—(from Menio), Asparagus viticellarus, Lythrum alatum, Solanum japonicum, Jasminum nudiflorum, Otstromeria aurontiaca, Sephrosia grandiflora, Crawfordia japonica, Mesembryanthemum brachatum, Armbilicus sempervirens, Echinopsis Egsirson, Fourcroya Molle aventiana, Agave caerulescens, Zephyranthus candida, Hydralia sempervirens, Gladiolus colvillii, Cistus virsutus Vitis hypoglauca, Sedum obtusatum, Musa superba, Musa species, Dracaena fragrans, Skimmia japonica, Begonia echinosepala, Aloe metroformis, Scaevola suaveolens, Hibiscus sp. (Sandwich Islands), Hudsonia tomentosa, Grass sp. (Sandwich Islands), Artimesia frigida, Albuca fastigiata, Primula purpurea, Primula veris, Primula capitata, Epiphyllum spectabilis, Epiphyllum carmineas, Scontis ovatus, Hæmanthus insignis, Clianthus punicens, Reona luxurians, Caesalpinia sappan, Glong glong (S. J.), Mesambryan thimum bicolorum, Cecacia cultraformis, Solanum tuberosa, Erithrina vespertitis, Eurybia Gunniana, Antigonum Leptolus, Bulbine frutescens, Polypodium linaere, Ceratoptius thalictroides, Dasylirion acrotrichum, Xanthorrhæa species, Dolichos sp. (from Java), Boronia serrulata, Pellea grandifolia, Pellea dicipisus, Deparica prolifera, Romula species, Gymnotturia conopea, Gladiolus permeabilis, Sparaxis bulbifera, Oxalis Isopetala, Romula McOwenii, Fuchsia refracta, Oxalis tropaoloides, Oxalis Peottia, Oxalis purpurea var. laxela, Oxalis Bowiei, Oxalis palæfolia, Oxalis comarensis, Oxalis purpurea, Oxalis hirta, Oxalis purpurea var. lilacina, Oxalis cernua, Oxalis consolea, Oxalis contraversa, Oxalis flava, Muscaria pulchellum, Ixia viridifolia, Ixia bulbæcodium, Gelasina azuria, Brodiæ tricolor, Homeria species, corbularia tenuafolia, Homeria lineata, Iris sysirinchum, Anomathus crudenta, Gladiolus segetum, Iris reticulata, Nerine japonica, Brodiae species, Pancratium species, Sachenalices palida, Cyrtanhura McOwenii, Narcissus aureus, Autholiza Ethiopica, Autholiza praealta, Ambrosenia Rossii, Scilla fugax, Scilla Peruviana, Walsonia Merviana, Iris scorfioides, Zephyranthus cordata, Iris jevicea.

From E. LeValley, Ionia, Mich.:

Six plants of Wisconsin weeping willow.
Six plants of Golden willow, Red osier.
Conical arborvitae.

From Edwin F. Smith, Hubbardston, Mich.:

Ribes rubrum.

From H. G. Reynolds, Old Mission, Mich.:

Linnaea borealis.

From R. Hayward, Aurelius, Mich.:

Sample of wheat, raised three years, from England.

From C. F. Wheeler, Hubbardston, Mich.:

Dried specimens for herbarium,—Artemesia Canadensis, Lonicera Canadensis, Lobelia Kalenii, Rychnospora copillocea, Graphephorum melicoides, Triglochni moritimum, Bromus ciliatus, Triticum dasystachyum, Panicum dichotomum Potentilla anserina, Circium Pitcheri, Campanula rotundifolia var. linifolia, Coreopsis lanceolata, Lilium Philadelphicum, Lathyrus maritimus, Equisetum variegatum, Juniperus communis, Juniperus Sabina var. procumbens, Arctostaphylos Uva-ursi, Hypericum Kalmianum, Halenia deflexa, Lycopodium, Annotinum, Juncus nodosus, Juncus acuminatus, Juncus Balticus, Carex orderi, Sphagnum squarrosum.

From Louis Miller, Ionia, Mich.:
Bulbs of Erythronium albidum.
From Thomas Reeve, Watertown, Mich.:
Stalks of Indian corn with two tops.
From L. H. Bailey, jr., South Haven, Mich.:
Plants,—Goodyera repens, Botrychium lunarioides, Botrychium dissectum,
From John Clark, Pontiac, Mich.:
Two fermenting traps.
From W. W. Walters, Utica, Mich.:
One half lb. onion seed.
From Dep. of Agriculture, Washington, D. C.:
Burbanle's seedling potato.
Dunmore seedling potato.

FARMERS' INSTITUTES.

At a meeting of the State Board of Agriculture held November 17th, 1879, the Committee on Institutes made the following report which was accepted and adopted.

Your committee recommend that during the month of January, 1880, Farmers' Institutes be held as follows:

1. At Rockford, Kent county, Tuesday and Wednesday, January 13th and 14th, to be attended by Prof. W. J. Beal, John T. Frazer, V. S., of New York, and Mr. Robert F. Kedzie.
2. At Big Rapids, Mecosta county, January 15th and 16th, same delegation as at Rockford.
3. At Manchester, Washtenaw county, January 19th and 20th, attended by R. G. Baird, Secretary of the Board. T. C. Abbot, President of the College, John T. Frazer, V. S., and Mr. F. A. Gulley.
4. At Romeo, Macomb county, Thursday and Friday, January 22d and 23d, to be attended by the same delegation as at Manchester, substituting Hon. J. Webster Childs for Mr. F. A. Gulley.
5. At Buchanan, Berrien county, 26th and 27th, attended by Professors R. C. Carpenter and A. J. Cook, Mr. John T. Frazer, V. S., and Mr. James Cassidy.
6. At Mason, Ingham county, January 28th and 29th, same delegation as at Buchanan, substituting Mr. F. A. Gulley for Mr. James Cassidy.

The committee also recommended that if possible, the Secretary attend all the Institutes especially with a view to reporting the same.

J. WEBSTER CHILDS,
GEO. W. PHILLIPS,
Committee.

The Institutes were held in accordance with the above, with this exception: Mr. John T. Frazer, V. S., who was employed by the Board to give a lecture at each of the Institutes, relating to veterinary, had a very severe cold, and realizing that it was not possible for him, under the circumstances, to profitably fulfill his engagement, it was cancelled after attending three of the Institutes. R. S. Jennings, V. S., of Detroit, was secured for the Romeo Institute, where he gave an excellent lecture on the Causes and Symptoms of various Diseases of the Horse's Feet and Limbs.

The able lectures of Dr. Frazer are given in this Report of the Institutes.

ROCKFORD INSTITUTE.

This Institute was held, commencing on the evening of January 13th, in Grange hall, which was well filled throughout the meeting. The first evening session was opened with prayer and music, after which the President, Mr. R. Dockeray, gave the opening address as follows:

Having been chosen by my brother farmers to preside at this—so far as I am aware—the first Farmer's Institute ever held in Kent county, I shall endeavor to perform the duties of the position to the best of my ability, and shall detain you but a short time with my opening remarks, as I am well aware that there are others here who will occupy the time much more profitably than I can.

These Institutes are designed to bring farmers and their families together in closer social relationship, thereby enabling them to receive and impart information by the discussion of topics interesting and useful to all which may be brought before the meeting. Farmers as a class live too much isolated, do not meet together, consult together, and act together, and the consequence is that while those engaged in every other business, occupation or profession have their associations and their unions, and are thereby enabled to act in concert and make their influence felt, the farmers by their lack of organization are deprived of that influence to which their numbers justly entitle them. For while the farmers outnumber all other classes and possess nearly, if not quite, half of all the wealth of the nation, and are possessed of as much intelligence, yet they exert less influence in the affairs of state and nation than any other class. What is the remedy for this state of affairs? Simply this: the farmers must learn to attend to their own business and not intrust it to others. They must see to it that they are represented in the councils of the state and nation by men of their own class whose interests are identical with theirs, men of their own choosing. When this is done, and not till then, may they expect to derive a fair share of benefit from the money they so largely contribute in the way of taxes to carry on the government. To illustrate my meaning I will quote from the report of Wm. G. Leduc, Commissioner of Agriculture, made in November, 1878. Many examples might be furnished to prove this part, but I must not take the time. But the world moves and all over the land the people are being aroused and agricultural papers are being established and well patronized. The Grange is doing its work, farmers' clubs are being organized, the public schools and agricultural colleges lending their aid, and farming is being conducted on more scientific principles and the prospect looks brighter for the future. But time is required to accomplish all this. "Large bodies move slowly, but when once in motion their force is irresistible."

The agricultural is, in some respects at least, of more importance than all interests, for of the entire value of all exports of every kind and description for the year 1878—$739,971,739—agriculture contributed $536,038,951.

[Mr. Dockery quoted from the report of the Commissioner of Agriculture for 1878, showing that a very small amount of the public money was expended in the interest of agriculture as compared with some other interests.

It is a defect of this kind of reasoning that the facts deduced generally prove too much, and are really worthless as a part of the argument or worse than that, for they frequently misrepresent and mislead. For example: what is expended for the advancement of commerce is often no less directly beneficial to agriculture. What is expended for the army and navy is as much for the protection of agriculture as any other interest.—SEC.]

Secretary R. G. Baird gave a lecture entitled, "Farmer's Boys in Relation to Farming." (See Lectures given at more than one Institute.)

John T. Fraser, V. S., gave the following lecture on

WINTER CARE OF LIVE STOCK ON THE FARM.

Mr. President, Ladies and Gentlemen:

When the two ends of the day seem to try to join each other at noon, in December, the farmer should redouble his activity and watchfulness; and when the cold seems to strengthen, as the days begin to lengthen, in January his care should not be lessened if he would be prosperous.

Though the climate of this latitude forbids active operations in the field during the winter, the thrifty farmer finds in his farm-yard and barns an area which, if not large, affords him ample room for a great deal of work and careful supervision. His cattle can no longer shift for themselves to advantage, and must be fed and cared for if he would find a balance in his favor in the debit and credit accounts between him and them; and if he would make sure of such a balance there are certain conditions which he must fulfill. These necessary conditions are economy in feeding, preventing waste within the animal's body, and the preservation of the health and vigor of the animal.

As to the question of economy in feeding, I cannot, I am sure, do better than to refer you to the tables and remarks of Dr. Kedzie, published in the Report of the Secretary of the State Board of Agriculture for 1878. They also answer the question how to prevent waste within the body, so far as the body is dependent upon the different elements of food, and is not affected by external conditions. The external conditions come properly within the province of our essay and we will consider them after studying the conditions of health in the different animals of the farm-yard.

In looking over a farmer's yard in this country we generally find a number of horses, horned cattle, sheep and pigs, each class containing members aged from young to old; but for the purposes of our essay we may divide these animals into the following classes, viz: work horses, brood animals, growing animals, or young stock, and those being prepared for the butcher, or fattening animals. The treatment of the members of these classes may differ to a greater or less extent. With many farmers the wintering of their work-horses is almost pure expense, the only item with which the horse can be credited being the manure he makes; and in such cases the farmer is justified in economizing, as much as may be consistent with recuperating the horses, and giving them a renewed vigor for the toil of the coming spring and summer. If we examine the digestive system of the horse we will find that the stomach is very small, compared with the size of the animal, "its average capacity in an ordinary sized horse being from 3 to 3½ gallons." I think we could ask no better evidence of the fact that the horse is ill-adapted for consuming food of any kind having a small nutritive value compared with its bulk. And in wintering idle horses the farmer should not allow them too much straw or poor hay; and a ration of grain should be given each day, which should be increased as spring, with its season of labor, approaches; in this way the horses will be less liable to contract that much dreaded disease of horseflesh, viz.: the "heaves" or pulmonary emphysema. It is a common practice with some farmers to turn their horses to the straw stack for the winter. This plan has the advantage of requiring but little labor on the part of the farmer, and affording the horses the opportunity of taking ample exercise. But good shelter should be provided, and the ration of grain already commended should be given. Before turning out his herd of horses for the winter the farmer should see that there are no effects of strains, received the past season, remaining in any of the horses. If there should be any a blister should be applied, and in some cases firing may be necessary. The winter's rest will be found to be a great support to the medical or surgical treatment. Horses that are being worked hard during the winter should be fed as during the summer, and be well protected from drafts of cold air when heated. They should never be left in the stable with the coat wet or damp, but should be well rubbed with dry straw or cloths and then covered with dry blankets. Within late years there has been introduced into this country a practice that cannot be too highly commended, as a means of enabling the horse to do hard or rapid work with greater ease and comfort during the winter, viz.: clipping, which consists in removing the thick coat of long hair that covers the animal at this season and interferes to a great extent with the healthy action of the skin while he is working hard. This operation will often prevent the invasion of acute diseases, and is sometimes of absolute necessity, as a therapeutic measure in the treatment of chronic diseases of the chest.

From my own experience, I am sure that we can give a working horse better care, with less than half the labor by clipping, than we could by leaving the thick coat of hair, to be wet by rain or snow or sweat, while he is working. But the clipped horse should receive constant attention while at work; when he is allowed to stand he should have a double covering of blankets, and while he is in the stable he should have a single, warm blanket for covering. Brood animals, with growing stock, should always occupy the first place in the farmer's attention. In case of brood animals he should remember that their systems, are undergoing a peculiar, and severe trial; and that he has at stake, the welfare of a being yet to be brought forth. This class of animals should receive good, nutritious food; "the regular development, and a good constitution in the fœtus depend upon it;" without being too fat they should be in good condition. "Plethora and obesity predispose to abortion, and render parturition difficult;" and again, if the animals are too thin, the milk is likely to want in quantity and quality. Young animals often seem to be predisposed to rickets, and sometimes it would seem that the predisposition was due to a want of bone-forming material in the food furnished the dam; and the difficulty is often prevented by feeding her with ground bones during the period of gestation; and as the animals are not likely to be injured in this way, it may be found an advantage to keep a quantity of finely powdered bones within the reach of all brood animals. All animals of this class should be provided with dry, warm quarters, and allowed free access to water; in this way long periods of thirst, to be quenched by heavy draughts of cold water, a prolific source of abortions, are avoided.

As the term of delivery approaches the food, without ceasing to be substantial, should have a relaxing influence upon the system; if roots of any kind can be given they will be found a great advantage; for, aside from acting on the digestive system, they will increase the supply of milk. Bran mashes or gruels may be given from time to time if there is a tendency toward constipation. In some cases it may be found necessary to resort to saline purgatives; $\frac{1}{4}$th lb. doses of epsom salts at intervals of four hours may be given to the mare, and cow, and smaller doses for the smaller animals.

Acute constipation is of frequent occurrence in foals dropped during the winter, or early spring. If taken in hand in time, injecting mild soap suds into the rectum a few times, will generally bring relief; but if neglected, or if the trouble has not been discovered for some time a table-spoon-full of castor oil should be given to a very young foal, in company with the injections, and a larger dose of oil may be necessary in older animals. Constipation in the yound animal should be carefully looked for, in cases in which it has been found necessary to draw the milk from the dam, for a length of time before delivery. Diarrhœa is sometimes met with in young animals at this time, but this is a trouble requiring skilled and experienced treatment; but in all cases the food of the dam should be changed, as the irritation of the intestines is often caused by the milk.

Young animals dropped the preceding spring, or summer, should be provided with warm quarters, properly ventilated, and with all the good food they will eat. Young animals never should be put to the drudgery of working up coarse or damaged food; their digestive organs are yet weak, and should be favored with plenty of well cured hay, roots, if possible, and liberal rations of grain. The food for growing animals should be rich in albuminoids and phosphates, as these substances will furnish the material necessary to the growth of muscels and bones. If the digression may be permitted, I will remark that it has been found, that crops manured with concentrated manures, or phosphates, contain a larger amount of bone-forming matters than those which have not received artificial manures; and the farmer need not look to the crops alone for the return he expects from the superphosphate he has sown.

The production of meat is a branch of agriculture that should receive a just share of every farmer's attention. Winter fattening of animals is often a source of profit to those who practice it. In feeding animals at this season for the butcher, the farmer should use his store of food economically and try to keep his animals healthy. The cheaper the food used in feeding such animals, the greater must be the farmers' profits, if he gets the required amount of fat in a reasonably short time; but in all cases he will have to depend principally upon concentrated foods; and it is combining the concentrated foods, with the coarse, in just proportions, that he will make his economy. Comparative Physiology teaches that most of the domestic animals require a certain bulk of food, in order that digestion may be properly carried on. We find that from two to three pounds per day is an average increase in weight in the case of the ox, when being fed for the butcher; and it would not be difficult to put the substances which represent this increase, and those that would compensate the necessary daily waste of the animal, in a very small compass; but when we come to examine the stomach of the ox, we find that our ration for the day would occupy but a small portion of the space we find there; and if we should persist in feeding such a ration it would not be long before we found that our animal had but "a poor show" for a three pounds' gain. This fact of the animal requiring considerable bulk in his food, may be turned to good account by the farmer, in feeding catttle or sheep, for example, he can take a quantity of corn stalks or straw to furnish the bulk and combine with them other foods of small bulk, but rich in fat producing substances, as corn, or oil meal or even oil itself, as is done by European feeders.

In this country the farmer will have to govern himself in feeding cattle or sheep by the market he is feeding for; if it is for an American market he will need food rich in albuminoids, as very fat beef or mutton is in but little demand. But if it happens that his animals will make shipping stock, he need have no fear of making them foo fat. In the later stages of the fattening process the farmer may find it difficult to make his animals eat as much as he would like. In such cases he may resort to the class of drugs known as condiments, such as salt, pepper, garlic, onions and vinegar; but in all cases these matters should be used in small quantities and with caution. A variety of food should be at hand, if possible, and the animal's caprices of appetite humored. A careful eye should be kept upon each animal. If it is found that some of the herd or flock refuse their food, but still have a bright eye, and continue to ruminate, the food should be changed and a smaller ration given for a time. If the eye is dull and rumination suspended, there is some derangement of the system which perhaps may be corrected by giving moist or green food; and if the animal has been fed on dry fodder it may be necessary to give a dose of epsom salts,—1 ℔. for an ox, and 2 oz. to ¼ ℔. for a sheep. The disease most liable to trouble the farmer in feeding cattle or sheep for the butcher is impaction of the third stomach, and is most likely to result from the use of dry food, and late in the feeding season. As the animals are becoming well loaded with fat, and the time for sale or shipment draws near, green food of some kind should be added to the daily ration; and if a little ground oil-cake can be given it will be found a great help, both on account of its richness in fat producing substances and the stimulating and loosening effect it has on the digestive system of the animals. We often find on the farm quantities of hay or corn stalks that have been damaged by heating and moulding; such matters should be fed with caution to any animals, and more particularly to those in the later stages of fattening; for aside from the possibility that they may cause difficulty in the digestive system, they very readily act upon the urinary system, and often with serious or even fatal effect. Animals that are being fattened should be housed in a warm and moist rather than in a cool and dry atmosphere, as they are found to take on fat better in the former conditions than in the latter. The stables should be dark and the animals kept quiet as possible. Noisy and restless members should be drafted from the herd before the feeding season commences; such animals never do well themselves and are a source of annoyance to their neighbors in the stable. In this class of animals the farmer does not want to develop the bones and muscles to a great extent, and he should keep them in health by means of an intelligent regulation of the ration of food to the animal's wants, combined with thorough ventilation and drainage. Thus far we have assumed that all animals were to receive better shelter than is to be found on the lee side of a grove, a straw stack, or a barn. The question of housing animals during the winter has been discussed and rediscussed during the past year by our agricultural press, but I have never seen the system of leaving animals unhoused defended, except on the grounds of present expediency.

Intelligent writers upon the subject do not attempt to deny that there is waste of food when animals are fed out of doors and exposed to the winter's cold, but argue in this way, viz.: "We can furnish the food necessary to supply this waste easier and cheaper than we could put up suitable shelter for our cattle." Such *may* be the case, but surely we may be pardoned if, after forming something of an idea of the waste of food in the animal's body when exposd to such weather, as we have reason to believe often exists on the Illinois prairies, we entertain serious doubts of the system being economical, even as a *present or temporary expedient.* I think that if we could measure the waste of food there is in feeding sixty or one hundred head of steers in the open air, exposing them to the cold winds and storms of a prairie winter, we should find that the food so wasted would keep and fatten a goodly number of cattle, which, if sold, would go a long way towards paying the interest on the capital necessary to shelter them and the rest of the herd. But the farmers of Michigan are not those of Illinois, and how to save food in wintering stock must be an important question to a great many of them. I am sorry that I have not been able to find the data necessary to making an estimate of the probable waste of food in feeding cattle when exposed to the inclemency of our winter; but I think that in reviewing the different sources of waste in such circumstances we will conclude that if the waste is not enormous, it is at least sufficiently great to make it an object for every farmer to prevent as much of it as may be in his power. The first source of waste with which we meet is the heat required from the body to raise cold food ingested to its own temperature. It must be evident to every one that all matters taken into the body must be brought to its temperature. If we drink water at 33° F., it will take up about sixty-five degrees of heat for each unit of water in order to reach the temperature of our bodies, and at the expense of heat taken from the system. If we drink tea or coffee at 150° F. we furnish the body with about 52° of heat for each unit of water. One of the advantages of cooked or steamed food for cattle is that we can feed it at or a little above the temperature of the body of the animal; but a steaming apparatus is too expensive for every farmer who has perhaps but ten or fifteen head of cattle. But this little is within the reach of most farmers, viz.: furnishing their stock with water from a well or living spring instead of from an ice-bound brook or lake. The other conditions of waste of food in the animal we will find in the surroundings of the animal and for the purpose of better studying these conditions of waste, we will compare the animal to a steam engine; and modern physiology will justify us in assuming such a position. The activity of the animal is dependent on oxydation or combustion, and the consequent evolution of heat, combined with a certain amount of combustion of matters in the lungs; and we shall see hereafter that preventing an undue escape of this evolved heat is an item of true economy for the farmer. If we visit a properly managed manufacturing establishment we will find that the proprietor has taken every precaution to prevent the escape of heat before it has been used for his benefit. The fire and boiler are surrounded by non-conducting material; the boiler is made with a series of tubes, through which the heated air is made to pass, thereby bringing every unit of heat possible to the work of generating steam; or in other words, converting the heat into a motive power. But when we turn to the *animated engines* of many farmers it would seem that the chances were in favor of the escape of heat, and consequent waste of fuel or food.

Let us now look at the conditions that affect unsheltered animals. In the first place we find them at the mercy of cold winds; every moment millions of atoms of air are hurled past them, each one hungry for heat. It is true that the animals are covered with a thick coat of hair or wool, which is a poor conductor of heat, and the air does not get as much heat as it might; but the postures and actions of the animals afford us ample proof that a great deal too much heat is carried away to be comfortable for them. But we will suppose that it has rained for some time and the coat has become wet, which will have rendered it a good conductor, and the air gathers plenty of heat as it passes, and the animals gather themselves closer and closer together, seeming to try to keep the little warmth they have. Again, the wind may blow little or not at all, but after a long rain the weather has turned cold; the wet coat, aside from being a conductor of heat from the body, must be dried, and at the expense of fuel furnished from the farmer's store of fodder. Who of us has not experienced an evening in winter when it would seem that the clouds had fled to a warmer clime, the smile of the moon in its glory, and the twinkling of the stars seem to be satires on warmth and comfort; even the winds are too cold to blow. How fare the houseless flocks and herds this night? The farmer may have fed them well and given them plenty of straw for bedding, yet they are cold and wasting the food he has given them. One of the characters of heat is its property of being radiated; thus if we hold a heated body near our face we feel its heat, which is called radiant heat. In nature radiation is going on between all heated bodies. The dew of summer and the hoar frost of autumn are effects of the heat of the earth being radiated. We have all noticed, I dare say, that dew is not formed during cloudy nights, nor beneath the overhanging branches of trees. In these cases the clouds and leaves intercept the rays of heat and return them to the earth, which does not become cold enough to precipitate the moisture of the air. The heat of animals is as readily radiated as that of inanimate bodies. "The lemming, a small animal of the rat tribe, has been known to perish from this cause when the temperature of the air was at the freezing point of water, or even above it." "In the polar regions the dogs employed in drawing sledges are unable to resist the cold when at rest unless confined in snow huts, where radiation is prevented, though the temperature of the air in these huts is from zero to three and four degrees below."* If the radiation of heat from the body of the lemming destroys its life with the thermometer marking +32° or a little higher, what must be the tax upon the systems of some of our cattle and horses placed in the same positions and the thermometer marking from 0° F. to 10° F. below? I am sure we have no reason to wonder that we see so many animated skeletons in barn yards every spring, and after having seen the same frames well covered with fat the preceding autumn.

After reviewing the different external conditions that affect the farmer's animals when not properly sheltered during the winter, we may find it interesting to study the internal processes of waste of the animals under the above described conditions. In all plants used for food for animals, we find a number of substances of simple composition which if burned are resolved into carbonic acid and water; starch, sugar and gum are of this class, and are commonly called the amyloids; but, for our purpose, they may be called the combustibles, as they are consumed in the animal's system in producing heat in ordinary circumstances; aside from these substances we find in grains, and in different parts of the plant one of more complex composition, viz.: oil. Vegetable oil closely resembles animal oil, and is readily converted into fat, which is stored up in the body, when the animal is properly fed; one of the functions of fat, when stored up in this way, is to protect the animal from cold; it being a poor conductor of heat; but in case of need it is consumed in producing heat. Besides the fats and amyloids we find a number of substances of a most complex composition. These substances combine with the elements of the amyloids or fats, a quantity of nitrogen, phosphorus and sulphur; and are called the albuminoids; they supply the muscular and nervous systems with nourishment. A just combination of these three classes of matters in the food for animals, would be the most perfect economy we could ask in agriculture, were it not that the *just combination* would, in practice, require too great an expenditure of time, money and labor on the part of the farmer. If the substances of each of these classes are present in the food in the required abundance, the animal thrives, at least does not lose; but if we suppose that the amyloids are wanting we will be obliged to account for a change or derangement of the system. When the amyloids are wanting we find that a requisition is at once made upon the store of fat, which will be honored to the full extent of the stock on hand, and the animal is losing in weight, or as is commonly said, is getting thin; when the fat is gone the matter becomes serious; the albuminoids, if not consumed in producing heat, are gradually used up by the animal in masticating his food and in moving about in search of food. We will now find that *thin* has reached the superlative degree, and if spring is not near, we may expect to see the already smoldering fire of life go out. If we begin at the other end of the scale we will find the same end brought about, though by somewhat different steps, as we will find most usually in practice, to be the case; let us suppose the albuminoids wanting in quantity in the food supplied, but the amyloids and fats in abundance. In such cases we are almost sure to find that the amyloids and fats are in a rough condition: being stored up in corn fodder or coarse straw, and these substances have to be thoroughly masticated before the intestinal juices can act upon the digestible portions; but we find that mastication can be performed only by muscular force, and consequent use of albuminoids, and these substances will be in high demand with a limited supply, the fats will be used in order to keep up the heat of the animal, and aside from his getting thin, he is getting weak; and mastication is imperfectly performed, and as a consequence digestion is incomplete. In this instance we often find that the process of starvation is cut short by acute diseases; large quantities of imperfectly masticated matters taken into the system, cause irritation of the intestines, and acute indigestion sets in; the horse dies of colic or of imflamation of the bowels, and cattle and sheep of impaction of the rumen or of the third stomach. If brood animals, kept in this way, have carried their young to the full term, metritis is very liable to follow parturition; and in some cases in which animals are poorly kept, we find that lurking germs of hereditary diseases spring up and the animals are carried out of their misery, while if they had been well fed the disease might have lain dormant for generations. If we examine the air as it is expelled from the nostril of an ox or a horse we will find, that during the time it has been in the lungs it has lost a portion of its oxygen, and has acquired an increased quantity of carbonic acid; and more, that by these changes the air is rendered incapable of supporting the higher forms of animal life. It is estimated by different experimenters that the horse vitiates, by breathing, about 400 cubic yards of air during twenty-four hours; the ox over 300 cubic yards in the same time. We can readily see from these facts that when we confine several animals in a stable we must make provision for a constant supply of fresh air and free escape of the heated and vitiated air that has been breathed by the animals, if we would have them thrive.

---

*Coline Traite de Physiologie comparee des animaux.

The best means of ventilation consists of a series of shafts, or hoods, passing from the stable through the roof, through which passes the heated and vitiated air from the upper part of the stable where it accumulates, and a number of openings near the floor of the stable; by means of these openings the stable is supplied with fresh air to take the place of that which has passed out through the shafts. These openings should be so arranged as to avoid drafts of cold air in the stable; this may be done by connecting the openings with bent tubes in which are placed slides or dampers. Thorough drainage is quite as important for our animals' as for our own welfare; and we find many low forms of diseases in our domestic animals which are due to the same causes that produce them in men. All sources of water for animals should be guarded from the possibility of coming in contact with liquors from the stable or barnyard; in this way we will guard against the invasion of many of the internal parasites of the lower animals. Nearly all of the internal parasites of animals pass some stage of their development in the water; passing thence into the animal to undergo another stage of development, and sometimes passing into another animal, as the final host; thus we find that the disease of the brain of sheep so prevalent in some parts of the Old World is caused by a cyst formed in the substance, or in the covering membranes of the brain. This cyst is known as the hydatid form of one of the tape worms of the dog *Tœnia Canurus.* In the dog the mature form of the tape worm is found giving off, constantly, portions of its body, or joints, which pass out through the fœces of the dog. These joints contain the eggs of the worm, and being liberated are washed by the rain and become lodged upon blades of grass or in the water, and are finally taken into the system of the sheep, where it finds its way to the brain and commences its growth as a hydatid, and soon destrys the sheep. These hydatids are often taken out of the sheep's brain by the shepherd and are eaten by his dogs, or in examining a dead body he gives the brain to the dogs and the hydatid is soon changed into the mature worm, which fixes itself to the wall of the intestines, and the round of changes is commenced again. In the same way the *Tœnia Solium* of man is furnished by so called "measly pork," and the *Tœnia Mediocanellata* by measly beef. The eggs of these pests are taken up by pigs or cattle, in the stomachs of which they are hatched and the young bore their way into the muscles, where they rest as hydatids; and the pig or ox is fattened and butchered and the hydatids are set free in the system of some lover of rare done ham, roast beef or steaks, who in his turn gives a fresh supply of eggs to pigs or cattle. And through the list of animal parasites we might go, finding this interchange of different forms from one animal to another, and nearly always finding that water was the connecting link. Such being the conditions for transmitting these often dangerous visitors from one host to another, does it not become every farmer, not only for the safety of his animals but for the safety of his family, to see that there is no communication between his barn yard and wells or springs, and between cesspools and streams of water?

En résumé: I have endeavored to show that the farmer's aims, in wintering his animals, should be to give food suited to the particular needs of his different animals, preventing a waste of the food within the bodies of the animals; and lastly, to conserve the health of the animals by supplying the conditions necessary to health in food and surroundings, and to avoid or to prevent the access of injurious elements to his animals.

DISCUSSION.

Mr. Scranton said he differed from Dr. Fraser in regard to clipping horses. It appeared to him as foolish as it would be for a man to strip off the heavier clothing worn as a protection from the cold of winter and then depend upon stimulating food to keep up the animal heat. He believed that the long, thick coat of hair was nature's protection from the cold of winter and it was a cruelty to the animal to deprive him of it.

Mr. Lapham said that if as farmers we would take heed to the many excellent suggestions contained in the lecture our animals would be much more comfortable, look much better, and also be more profitable to their owners.

The propriety of clipping horses in winter was questioned by several others, who thought it was not the proper thing to do in this climate.

Mr. Fraser claimed that he had been to some extent misunderstood. He advocated clipping horses that were working steadily, for the same reason that a man in doing work would take off his overcoat. When the horse is at rest or exposed to cold he should of course be properly protected.

Prof. Beal asked whether a horse should be fed all the hay he would eat.

Dr. Fraser said the small size of the horse's stomach should be considered. When horses are doing a full amount of work and have but a short time to eat they should have concentrated food. The most concentrated he would feed first. When the horse is not doing work, or doing but little, he would reverse that order.

FORENOON SESSION.

Fremont E. Skeels read the following paper on

INJURIOUS INSECTS.

A most interesting as well as instructive study for one to follow is that which pertains to insects. It is entertaining, because nowhere else does nature present more striking realities; instructive, because it gives one an incentive to notice and to acquire the habit of observation, which habit once attained will bring us into immediate contact with nature's rarest gems.

Those who look carefully, earnestly into the workings of the insect world, will discover a vast field of entertainment as well as instruction. Some there are who insist that nothing entertaining can be found in the wriggling worm or tiny beetle which can be seen only by the aid of the microscope; but these have only glanced at the threshold of this department of life; it must be crossed before they can enter into the delightful realms beyond.

But there is a necessity for this insect study; men must keep pace with the wonders of the insect world. Before the extensive forests and vast marshes—abounding in plants of every description—were turned into fields covered with agricultural products insects found abundant plant-food. The scene has changed. Their favorite plants being destroyed they have been compelled to come to the farmer and horticulturist for food. It is estimated that there are four species of insects for every species of plants in some of our most populous States. These facts would seem to decide the importance of the study of Entomology.

But my subject was to be Injurious Insects, and craving pardon for dwelling at length upon my particular hobby, I proceed at once to duty.

Probably the most important crop to the Michigan farmer is that of wheat; the insect which prays most upon this cereal at the present writing is the Hessian fly, known among us as "the fly," "the insect," and by other appropriate names.

Very much has been written, more has been said; much more will probably be written and said about this little pest, yet it continues to despoil our wheat fields. The remedies thus far advised are many but without thoroughly beneficial results.

The Hessian fly is, undoubtedly of European origin; it was not known in this country prior to 1778, and then found in the vicinity of New York. The name was first given by Col. George Morgan, because he supposed it to have been brought from Europe as pupæ, concealed in the straw, which was shipped upon the vessel bearing the Hessians to this country. The habits of the fly, as will be shown, readily admit of such transportation. Commencing then at New York, westward the scourge of empires takes its way, progressing from twenty to thirty miles each year until in 1860 we find them settled in Iowa and Minnesota.

One of the seemingly curious facts in connection with the Hessian fly, is its sudden appearance for short periods and then its apparent disappearance. Thus in 1872, it was among us in Michigan, and also south and southwest. It was not noticed again until it celebrated its centennial in the southern part of this State, appearing as far north as the capital. This going and coming is easily accounted for (though to the close observer it is well known that there are always some few to be found), and is particularly noticeable in all insects which are not provided with some odor or other means of defense against parasites and birds. Insects having such means of defense are very uniform in number. Is it not then safe to reason that we are indebted to the parasitic enemies of the Hessian fly for its short absence? As these enemies become more numerous, more larvæ of the fly must perish from their attacks which are made by laying an egg in each egg of the fly. These parasitic enemies are somewhat inclined to become gluttons, and in a few seasons not enough flies will remain to furnish them with sufficient eggs for their deposits, and consequently some of the parasite's eggs must suffer death. Another season still more must perish, until finally the flies become nearly extinct. In the meanwhile there will always be some few of the Hessian flies left. After the parasites are gone these flies will increase until they become legion, showing their presence by laying waste our wheat fields; this work will continue until the nucleus of the parasites shall have grown into supremacy, when another disappearance of the fly will be noticed.

This insect is very small and might pass for a mosquito to the casual observer. The imago fly is black with the wing bases, joints, underside of body and legs of a tawny or light yellow color. Just previous to laying her eggs the well stocked abdomen of the female is rose colored, like that of a well filled mosquito; this color is given by some two hundred eggs which are of a redish color, alighting upon the surface of a leaf she places from one to ten eggs in its creases, in from twenty seconds to a minute of time, and is off immediately in quest of more mischief. In from four to fifteen days, depending upon the weather, these eggs hatch into minute maggots which at once commence a journey down the leaf; working themselves in between it and the main stalk, they continue toward the root until they come to a joint just below the ground surface; they here fix themselves upon the stalk and remain stationary until completing their transformations. While in this position they do not eat the stalk, for maggots have no jaws, neither do they enter the inside of the stalk, but lying lengthwise upon its surface, they are nourished by the sap which they take in by absorption. It is the loss of this sap that causes the wheat plant to perish. After remaining thus for five or six weeks the maggot takes on a rich mahogany color, becomes hard, and is said to be in the flaxseed state.

In passing through an infected field we will see many yellow, drooping plants; pulling one of these and stripping down the outside leaf of the now worthless plant, we shall find the cause of all this in the little hollow which his body has formed in the stalk. There are two broods each wheat year, and favorable weather has produced three. In the latter part of August or in September, the eggs are laid for the first brood; these live over winter in the flaxseed state, producing flies in April, which immediately attack the wheat left by the fall brood.

The most popular remedy is late sowing, but its success is an open question. I should say, sow the most thrifty growing wheat which you can obtain. Sow it in due season and in the best of soil. Add plaster to the soil and anything else which will produce a large stalk. The larvæ of the fly lives upon the stalk, and if we can produce a large straw it will grow its head and feed the larvæ too. Suppose in the spring you find your field filled with this insect in the maggot or flax-seed state? If not too late for safety, and if the wheat is very thrifty, turn in a flock of sheep and let them feed it down. Some have suggested the burning of stubble, but as this destroys alike our friends and our enemies, I should hardly deem it advisable.

Many and just are the complaints entered against another troublesome insect. I refer to the cut worm. This little mischief maker is the young of a very common moth—or miller, as they are often called.

Wire worms and grubs are often called cut-worms, and the evil which these grubs bring about is often laid to the cut-worm, and cut-worm remedies are applied without success. It is well known among farmers that cut-worms live upon the tender shoots and underground stems of plants. These worms are well known too, and I will simply say that grubs and wire-worms have many feet and are the young of beetles instead of moths. The large white grubs are the young of the May beetle, and the wire-worms are supposed to be the young of snapping beetles,—or bugs, as they are commonly called.

Many remedies have been advanced. Most popular among these are digging, protection of stalk, and fall plowing. It is doubtful whether fall plowing is to be recommended. It might give the birds a chance to pick up a few, but the ordinary freezing and thawing of our winters has little effect. The most effectual remedy for large fields has been to sharpen up the fingers and proceed to meet the enemy on his chosen ground. Nor is this actually "locking the barn after the horse is stolen," for it prevents the loss of any more plants by the jaws of our fallen foes at any rate. Transplanted plants may be saved by protection. Suppose you are setting out young cabbage plants. Take a piece of writing or any glazed paper and wrap around the plant just above the ground and reaching down to the root, keeping it in place with a mound of earth. Ashes, lime, or any other alkaline substance added in sufficient quantities to kill or drive away the worms would also kill the plants. Climbing cut-worms scorn to grovel in mother earth, and aspire to higher things. They may be found at night taking the buds from dwarf or young fruit trees. These, and I might add, all cut-worms, may be caught in great numbers by placing heaps of freshly mown clover or grass upon the infested ground. The worms will secrete themselves beneath the pile, and may be caught and destroyed. To keep them from ascending the trees, use strips of firm, glazed paper three or four inches wide, gathered or cut short at the upper edge. If the paper is gathered, tie it around the tree trunk so that the lower edge shall not touch the tree. The band will then assume the shape of an inverted tin pan over which the worm cannot climb. By cutting one edge of the band short it may be tacked upon the tree. The larvæ of the codling moth—or apple worm, as it is commonly called, belongs among the meanest of insect foes. The little moth flies only in the night, is not attracted by light or very much by jars of sweetened water, and lays its egg in the blow end of the apple. As soon as the egg hatches the worm enters the fruit and proceeds at once to spoil it. It indulges in this mischievous frolic for about twenty days, when it leaves the apple and spins its cocoon in some snug corner. In about two weeks a moth hatches from this cocoon, and again the egg-laying, apple-eating, cocoon-spinning process goes on; but this second batch of cocoons does not hatch until the next spring. What are we to do about all this? I have seen many a man cultivate and lay out a plat of ground for a garden, sow the seeds, set out young plants and tend them for a few weeks, but the task became irksome soon, the weeds got a start, and at the time when he should have been enjoying rich repasts of garden delicacies he was obliged to content himself by sending some of his "young hopefuls" to blister their hands upon the gigantic pigweeds and red-roots. I have seen young people start a diary January 1st, and heard them declare they would keep it correct for the year; but the March winds cooled their ardor, and found many blank leaves of February. It is this lack of perseverance on our part which enables insects to get our best farm products. If a man buys and transplants a hundred fruit trees and leaves nature to do the cultivating, pruning, etc., he must not expect large fruit returns. The codling moth can be fought successfully only by the combined efforts of a neighborhood. Eight or ten of our neighbors can rear more than any one of us can hope to destroy. Some few of the worms fall to the ground with the fruit and could be destroyed by turning hogs into the orchard if convenient. If you dont turn in the hogs keep the ground free from all chunks and clods which would afford the worms a hiding place. Most of the worms leave the apple before it falls, and crawl down the tree seeking a nest. Remove all loose bark from the tree. Now take carpet paper and cut into strips five or six inches wide, long enough to go around the trees and lap a little. Fasten with a tack driven in about half way to the head. The worms will spin their cocoons on the under side of this band. The bands should be placed around the trees about the middle of June and examined every ten days until the last of August. They need not be attended to again until after fruit gathering, when they should all be removed and laid by for next year's use. Many worms will be found in the fruit that is taken to the cellar, and by a little close examination many cocoons may be found and destroyed.

Within a few years a new insect has appeared among us whose only delight seems to be in stocking our cabbages with, as the ladies say, those horrid green worms. The parent of this evil is a small white butterfly, spotted more or less with black dots, which may be caught from the first sunny week in spring until the last cabbage is taken in in late fall. Two broods are hatched each year. The early females lay their eggs on the under side of the cabbage leaves; upon hatching the larvæ feeds for some time upon the leaf, then forms a chrysalis from which a butterfly soon comes, which proceeds at once to rear a new generation upon whatever is left of crop. The chrysalids of this last batch of worms do not hatch until the next spring. Many remedies have been tried with more or less success. These butterflies are slow fliers and are easily taken with a net and destroyed. Take a cask and place it near the center of a small patch; fill with water and dissolve enough whale oil soap to give a strong solution. The smell of this will keep many butterflies at a distance, for it is sure death if they come in contact with the liquid. About once a week the cabbages should be sprinkled with the solution. It has been, and I have often recommended the killing of the chrysalids; but just before completing this paper I examined about 500 chrysalids, which I obtained from the side of a dwelling-house and only about a dozen of them were alive. I say alive, but they were all alive, strictly speaking. A dozen of them would have produced butterflies next spring and the remainder were perfectly alive with parasites. I should say then let all alone, for the parasites will probably whip out the remnant the coming season. One word more in the tenor of this paper and I close. Many people have been foolish enough to apply Paris green to cabbages, and as the poison in this powder is arsenic some lives have been lost. Paris green should never be used except with great care. It must never be applied to those parts of plants which are to be eaten by any animal. Applied to potatoe tops it becomes a good remedy for the potatoe bug; but applied to cabbages which are to be sold in market or used as diet by any one, it becomes a remedy for the increase of the human race.

DISCUSSION.

Secretary Baird—Do you find many of the parasites of the cabbage worm?

Mr. Skeels—I have examined five hundred of the chrysalis and only forty of them would produce flies; four hundred and sixty were destroyed by the parasites.

Prof. W. J. Beal next gave a lecture on Horticultural Experiments at the Agricultural College.

(See lectures given at more than one Institute.) This lecture and the discussion upon it occupied the remainder of the forenoon session.

AFTERNOON SESSION.

Lecture by John T. Fraser, V. S., on the subject of "The Structure and Care of the Horse's Foot." (See lectures given at more than one Institute.)

Robert F. Kedzie, assistant chemist at the Agricultural College, gave a lecture entitled "Superphosphates on the Farm." (See lectures given at more than one Institute.)

EVENING SESSION.

After opening with some appropriate music Mr. Peter H. Felker gave an interesting address on the

ADULTERATION OF FOOD.

This address was extempore. The following is a brief synopsis of it.:

Mr. Felker set out with the declaration that a fair estimate of the amount of solid and liquid food a healthy man would consume in the course of a year would be 2,500 pounds. It was always best, he insisted, and cheaper in the long run to buy the best of everything, especially in the matter of articles. He first took up the subject of baking powders and showed how they were adulterated by the use of terra alba, or white earth and burnt alum—the latter very injurious to bread and forbidden to be used under stringent penalties by the British government. Mr. Felker illustrated by experiments with a simple decoction of logwood the presence of alum in baking powder; if present it turns the bright colored liquid a very dark purple. The purest baking powders were those known as the "Royal" and "Dr. Price's."

Butter was also adulterated; the butter maker sometimes used too much salt and too much water was left in, which, while not exactly an adulteration, is injurious, making the butter weigh heavily and in time become rancid. Mr. Felker described the process of making oleomargerine and the adulterations of confectionery with glucose and terra alba, and the various injurious articles used as coloring matter. Coffee when ground could be tested by being poured into a glass of water; the adulterated coffee would discolor the water. Mr. Felker questioned whether there was much genuine Java coffee to be obtained in this country. Coffee from Brazil was shipped to Arabia and the Dutch East Indies and came back to America as Java coffee. The only proper way to get pure coffee was to buy the berries green. Ground coffee was largely adulterated with chickory and the chickory was itself adulterated with half a dozen articles. Cream tartar, indigo, honey and jellies were very largely adulterated. Kerosene was terribly adulterated, and the speaker had found extreme difficulty this winter in finding a pure article. Parafine was largely used to make the oil heavy and benzine was added to make it average about right. Mr. Felker lays all the blame on the last Legislature for repealing the law requiring the chill test. The only complaint the people made was that the oil cost too much. It costs just as much now and is lamentably deficient in illuminating qualities. The wicks of lamps became gummy and burned low, which was solely to be attributed to the paraffine. The adulteration of milk and its results, as manifested in typhoid fevers, was enlarged upon.

The adulteration of soap with rosin was alluded to. Mr. Felker minutely described the adulterations of sugar, the practice obtaining to such an extent that several of the most honorable refiners in New York had retired from business and closed up their establishments, finding themselves unable to compete with the dishonest ones in the same business. Syrups came into the same nefarious category. Few people aware of the poisonous extent to which syrups were adulterated dared purchase them but confined themselves entirely to sugar. The only sure way to obtain a pure article was to buy the granulated sugar. Teas were largely adulterated, not only with the leaves of the willow and other trees, but with mineral matter. Tobacco was a favorite article for adulteration, as was vinegar, and of liquors, of course, it went without saying that rare indeed was the liquor to be obtained which was really what it purported to be. Spices were so extensively adulterated that the only sure way to obtain the genuine was to buy only the unground berries or barks. In closing Mr. Felker advocated a national law and stringent inspection. State laws on this subject were necessarily dead letters, because legislation of that kind could not hinder the manufacture or importation of such articles from other States.

In the discussion following this lecture the illuminating qualities of our present Michigan oil was somewhat fully discussed. The prevailing opinion seemed to be that taking the quality into consideration our oil was dearer than formerly.

Mrs. M. J. Kutz read the following paper on

BOYS AND GIRLS ON THE FARM.

Permit me to go directly to my subject without preliminary remarks, or apology. And in order to deal with it intelligently, I need first inquire, What cause led our boys and girls to forsake the farm heretofore? This inquiry takes me past hamlet, town and metropolis, across the Atlantic's waves to the shores of our "Mother Country." There I find the cause,—that transported to our shores in every emigrant ship has become an inherited disease that depletes our farm-houses and fills our towns and cities with Literary, Professional, Political and Commercial aspirants,—ten on the average, seeking a foothold where there is only room for one,—the nine, as a sequence, heart-sick and hope-forsaken, swelling too often the calendar of crime, or filling untimely graves, borne there by spiritual and physical starvation, for lack of congenial employment, or, lack of bread.

In England, that has contributed to our population more than any other nation,—whose habits have colored our own, and from whose institutions we have largely copied,—I find that respectable mediocrity is artistic, literary, mechanical or mercantile. While the aristocrat mainly owns the real estate, and gentility rents factories and lands but never labors itself. Extreme poverty toils in the mills and shops, and on the farm, and the most degraded of the class who labor, are those who work the soil; this is considered the lowest round in the ladder of caste. When the nobleman condescends to greet the gentleman and the gentleman arrogantly acknowledges the acquaintance of the book-worn merchant, mechanic, artist, etc., while shopmen and all look down upon the agricultural laborer with a contempt that utterly shuts him and his from social life, yet from the toil of himself, wife and wee ones is wrung the wealth that sustains a throne at a yearly cost of millions, and the prodigality of an aristocracy whose money is squandered as freely as waves wash the shore. God has given unto every human being aspiration. It is nature's prayer that lifts us to a higher life. The clownish boor feels its sting in his envy of those he sees above him, but, down-trodden for ages, and cut off from social culture and respect he knows not how, nor can he make it a lever to lift him and his to the coveted good; he only feels that he is ostracised because he is poor and a laborer; that labor is considered a disgrace by those above him in the social scale, and noting the cause of his degradation, transmits to his offspring his hatred,—a blind legacy,—bearing for all time its bitter fruits of theft and crime, lawless mobs and bloody "bread riots" in the empire of Great Britain. But, lo! One day the gates of Hesperides swung wide ajar, and revealed to the startled gaze of the Orient and all the East, this New World,—broad, beautiful and grand,—lands in plenty for new homes,—domains for nations to develop,—and "Westward, ho," "the star of empire" took its way; eager thousands sought these shores and secured small portions of its soil as homes. Mr. and Mrs., titles of respect they had never shared in the old world, fell like a mantle of glory upon them here, because they were Master and Mistress. But, where all could secure homes, each must serve, thus combining the dignity of ownership with the disgrace of serfdom; and often ludicrous indeed was the struggle with old ideas and inherited prejudices in this new phase of life. Let me illustrate.

On the farther verge of only fifty years ago, when I can first remember, if a mother was at the wash-tub or a daughter at the wheel, when some smart neighbor or young beau was reported at the front gate, the obnoxious work was hustled out of sight and matron or maiden hastened to don a stylish apron or "nobby" cap, and make-believe they were gentle-folks, and always nice, but everybody knew the work,—the work was there, and just themselves had it to do. Right here, Mr. President, I think I see you smile at the seeming weakness of my sex, but you and I can well remember many a coat and pair of pants with a boy inside of them, that has had occasion to make a quick journey around the corner of the barn, or behind the woodpile on similar occasions. Ah, ha! human nature is human nature under whatever guise; and what wonder, under such false training, daughters sought rich husbands, whether loveable or not, and sons preferred a clerkship in the city, or, questionable employment even at the gaming-table, to this shabby gentility on the farm that deceived no one.

But in those retrospective days of which I write there were other causes that drove the boys and girls from the farm. It was toil, not labor, men and women required of themselves and children. Unremitting toil for fifteen or eighteen hours in twenty-four. Nature's laws were ruthlessly broken. Young children were taken from their sleep at four o'clock in the morning to do "chores" by lantern-light, eat breakfast (if eat they could at that early hour) by candle-light, go to heavier toil at day-light, and stay afield as long as it lasted, do chores again by lantern-light, eat supper by candle-light, and husk corn or thresh with a flail, or turn the wheel on winter evenings till bedtime, wear homespun clothes and hodden-gray,—coarse and uncouth indeed,—for "store clothes" were too fine and costly and would not last; besides, to desire to look well was considered vain, and vanity was a sin. That was in the days when people supposed angels were only made in heaven, and all their beautiful drapery woven there.

It is no wonder to one that young people wished to escape from such circumstances, where learning was deemed a dangerous thing, and all recreation a sin except, perhaps, the "singin' schule" and husking and paring bees,—the last two tolerated no doubt because they were profitable.

To desire to appear well and command personal respect from others is as God-given as any other aspiration of the human soul. It dwells in the breast of every young man and maiden, and should be and would be cultivated to a ripe and beautiful old age if it were not trampled out by the iron feet of want and toil in the hard struggle for bread, where comparatively few win sustenance from the soil for themselves and the many viciously idle or cunningly successful pensioners on the bounty of the farm.

Naturally the boys and girls of the immediate past shrank from toil that was deemed only servile,—that denied the culture, hardened their muscles, rendered uncouth their forms, browned their cheeks and hands, stultified their intellects, and rendered them objects of aversion, ridicule, and contempt to their pliant, lilly-handed, delicately-clothed, well-educated city cousins, who living without physical labor were successful claimants of worldly honors and respect.

Now, Mr. President, what can we, or what shall we do to overcome past and present evils, and keep our boys and girls on the farm?

We can neither bribe nor coax them,—that we know. The broad sweep of our lands and waves, the free, wild rush of winds cradled in the topmost peaks of our Sierras, the vastness, might and freedom that pertains to all our country has nursed into being a race of little giants—"Young America," we call them,—who will neither brook coercion nor delay. Let us be wise and leave them alone. Nature is a master builder, and here on this continent she is building public opinion and society anew. Let us give it no anxious thought my brother and my sister; only just keep steadily at the work we have begun of forming farmers' clubs and granges, and State institutes and agricultural colleges where erudition feels honored to hold a professorship, and our sons and daughters can become refined and educated in all things, especially in the science of our profession,—the epitome of all others,—and understanding the laws of mechanism, can direct the operations of the farm and farm-house, and guide with intelligent hand the beautifully constructed machinery that relieves the strain on muscles to highly productive and remunerative results. Let us make agriculture an interesting study, and entering our legislative halls, by every means in our power provide for its protection and promote its advancement. Let us guard jealously our homestead laws, and so enact that labor and labor only can own the soil, and can never be dispossessed of its birthright to the land it tills,—the only sure safeguard of our freedom and prosperity.

Let us banish forever and in every case the back kitchen "lean-to," where our girls used to be, and are even now imprisoned from morning till night of many a weary day,—where the low-browed door creeps out under the sloping eaves into the chip yard, and the low ceiling bears down its hot reek on heart and brain, as housewives know with well remembered pain. Let us move the kitchen out bodily from behind, make it spacious of all rooms in the house, crown it with lofty ceilings, protect it with pleasant porches, promote it to a front door leading out upon a clean walk of its own, where while our girls compound the alchemy of life for the kings and queens of the household, they can see all the world as it goes by, and watch the progress of the age. Let us lift the soiled family linen from the shoulders of women and banish the weekly washings and ironings—those consumption-inducing, death-dealing ordeals—to the neighboring laundry where steamers and rollers can accomplish more effectually and neatly the desired results.

Let us investigate, and investigating learn how much cheaper are coöperative laundries, creameries and bakeries, where skilled oversight can teach our girls by a few pleasant hours of labor weekly how to administer scientifically and successfully to the necessities, health, and comfort of the loved ones at home.

Let us by every means in our power lay the burdens of life upon inanimate things, shorten the hours of labor, and multiply the hours of spiritual growth, intellectual culture, recreation, and enjoyment. Let us discourage by all the moral weight in our natures vagrancy in whatever form, whether clothed in broadcloths and gambling in patent rights and stocks and bonds, or in rags and tatters (equally a mendicant), soliciting alms at our doors. Let us make it honorable to earn our bread and disgraceful to eat it without, my brothers and my sisters, and our task is accomplished.

Our boys educated gentlemen, and our girls refined and cultivated ladies, in love with the beautiful farm-house and home, its pictured walls and well-filled libraries, its flower-decked walks, its breezy woodlands and rich fields of waving grass and grain, will find it for their happiness and interest to remain upon, and will show no inclination to leave, the farm.

The question as to whether it is desirable for the State to make of the Agricultural College an experimental farm and school was somewhat discussed, and all the expressions were in favor of so doing.

A number of commendatory speeches were made in reference to the work of the institute and the good which it had accomplished. Resolutions of thanks to Profs. Beal and Kedzie, Secretary Baird, Messrs. Fraser and Felker, Mrs. M. J. Kutz and others who had aided in making the institute a success were adopted. The session was then adjourned *sine die*.

BIG RAPIDS INSTITUTE.

The Institute at this place commenced on Thursday evening, January 15. The attendance at the first evening session was rather slim, but the next day it was good and on the second evening the large hall was well filled and a good degree of interest was manifested throughout. The Big Rapids and Green Glee Clubs furnished some excellent music. Col. N. H. Vincent was president of the Institute, and after the usual preliminary exercises gave the following opening address:

I believe this is the first meeting of the first Farmers' Institute ever held in Mecosta county. The objects of which organization, as I understand them, are for the purpose of enabling farmers and those interested in the farming business to meet together for the purpose of discussing questions and matters pertaining to the farm, with the view of cultivating and building up a better understanding, a better social feeling among farmers, and for the general advancement of the farming interests of the county.

I have been a farmer here for ten years or more, and while I have always taken a great interest in the development of the agricultural resources of the county, I have long felt the necessity of a better understanding among farmers. I think the farmers will all agree with me when the time comes for hiring help to do the work on their farms that it would be a great benefit and satisfaction to know just what wages their neighbors were paying their farm hands. It would be a satisfaction to know whether they have to pay $15, $20 or $25 per month. And I know there are farmers here who have introduced into the county improved farm machinery and improved breeds of farm animals who have felt the necessity of a better understanding among farmers.

Now is the time during these winter months for laying the foundation and making your arrangements for the work of the coming season, and I should like to have the farmers from all parts of the county attend the Institute, enter freely into the discussions that will take place during these meetings, exchange views, become better acquainted with each other, get the benefit of each other's experience, and when the Institute meetings close and you have returned to your respective townships, call the farmers together and organize a farmers' club or an agricultural society of some kind or character in every township in the county, hold frequent meetings and debating schools in your school districts, and you will soon cultivate and build up a higher standard of sociability, and acquire a better knowledge and proficiency in the business in which you are engaged.

I was one of the first to encourage the organization of the Agricultural and Mechanical Association which has existed in the county for about seven years, an organization which, though not as successful in some respects as we might wish, yet has been a great benefit and has done much toward advancing the farming interests of the county, and if you will take my advice after these meetings close and organize your township societies, hold frequent meetings during the winter months, and when spring comes take a little extra pains and pride in the cultivation of your crops, get up a rivalry between townships, and when the time comes for holding the annual fair, take your families and your samples of farm products, come to the fair and take part in the exhibition and I will guarantee that you will all be well paid and that the Agricultural Society of Mecosta county will be a grand success. Now, these being some of the objects, briefly stated, for which the Institute was organized, it is gratifying to me to see so good an attendance here to-night. When I see so many eminent men from home and abroad assembled here to assist the farmers in the discussion of matters pertaining to farm economy, I for one am greatly encouraged, and when I see the ladies here ready to cheer us on, as the ladies always are in every good work, we are indeed a very singular people if we are not encouraged and gratified. And now, ladies and gentlemen, and especially those of you who are here from abroad, and those who are not engaged in the business of farming, I can assure that your presence and your efforts here will be received with gratitude by all, and as president and in behalf of the farmers of Mecosta county, I bid you welcome to the Institute, trusting as I do that your indulgence here will be a source of pleasure to yourselves, as it will benefit and encourage us.

The remainder of this session was occupied by John T. Frazer, V. S., who gave his lecture on the "Care and Structure of the Horse's Foot." (See lectures given at more than one Institute.)

FORENOON SESSION.

Mr. R. F. Kedzie gave a lecture on "Superphosphates." (See lectures given at more than one Institute.)

L. G. Palmer read an essay on

BOYS ON THE FARM.

Boys on the Farm; and I may add, how to keep them there. Not *forever*, but until they have learned lessons of industry and economy, fitting them for any position in life. The boy should be kept well employed, otherwise he loses interest; and when that is gone, he might as well go, for everything on the farm will profit by his absence. How to create in him, and maintain that interest, is the question. A few practical hints as to what may be considered the "improved method" of procedure: First of all, let the home be made attractive, and as comfortable as circumstances will permit. If the boy could have a room or corner of his own, fitted up for his especial benefit, no matter how small,—no matter how cheap the furniture, a small table, and perhaps a shelf or two for his books and papers, a few pictures to adorn the walls, and any other little fixtures which might add to his comfort and convenience,—he could then entertain his companions in a manner pleasing to him, and with no inconvenience to the rest. Of course the boy can get along without making all, or in fact any of these provisions for him; but just *how* he gets along, is the matter to be considered. Let the boy actually feel that "there is no place like home;" but that sentiment may be true, either on account of its sunshine, or its shadows. It is a sad truth that many a boy, even of tender age, is content to take his chances in the world, even among strangers, because he in fact *believes* that "Thre *is* no place like home;" and he is heartily *glad of* *it.* Wealth is not essential to a proper and orderly arrangement of the household.

"Though you may not change the cottage for a mansion tall and grand,
Nor exchange the litte grass plat for a boundless stretch of land,
You may strive to make home happy with the wealth at your command."

I believe it is too often the case that the boy is required to act in the capacity of hired man, with this difference: the boy receives no wages. Let the boy be made to know and feel his interest in the home, and management of things generally, to such an extent that he finds it almost impossible to leave father alone, because so much is depending upon "father's right-hand" man. Instill into his mind that feeling, and he leaves the old homestead at last, not like the boy who "buys his time," but with genuine feelings of regret. Among the important things to observe in the early training of the boy on the farm, are the little responsibilities which he cheerfully assumes; and when they necessarily become weightier, he finds himself equal to the task of bearing them. Take his opinion on many subjects; act upon it sometimes, no matter how simple, if for no other purpose than to show him that it was erroneous; kindly point out his errors by reason and actual test, and he learns to honor your judgment, and at the same time receives credit for his own; he works with you instead of for you; and acts promptly at your request, rather than obeys your orders.

The boy is oftentimes permitted, even instructed, to call certain things his own. For example, a fine colt "belongs to the boy." He watches it, cares for it, dreams of it, firmly believing himself the sole owner. He realizes a sudden break in the title, when a fair market price is offered for the animal, and the proceeds go into his father's pocket. Now this may be all right if properly and fairly managed; but he should be called upon to relinquish his rights only by a fair understanding and with an honest belief that it *is* right, and that he in some way receives due recompense. Such a course lays the foundation for his fair dealing and honesty of purpose in all business transactions.

Another common error in the early training of the boy is this: He is allowed to go to town for the sole purpose of holding the horses while father does the business. Not that the boy is really needed to insure safety in business transactions, but he needs a practical insight into those common, every day business matters that he must soon manage alone. Let him help you test the quality of articles which you purchase; ask his judgment as to the price; give him yours, and before selling the load of wheat explain to him the state of the market, and why you accept the offer. There is no danger in the careful exercise of this freedom with the boy; you are at once giving and receiving information; you are closing his mind against temptation, by keeping it well supplied with interesting and instructive ideas, and strengthening that social tie that binds him to his home.

He needs entertainment and recreation, differing somewhat from that which is often given him. The traveling circus and side-shows afford but poor entertainment, and an hour or two between chores on the Sabbath is hardly sufficient resting spell.

Why not plan for him a short recreation tour? Let him break away from the farm and its surroundings for a brief season. He will return to his work with increased vigor. He needs to know something of society and of its laws and customs beyond what he may be able to learn in his own immediate neighborhood.

He must early be made to know that there are two sides to the picture of life,—a dark as well as a bright one,—both of which must sometime meet his view. Prepare him then for the emergencies and the ups and downs of stern reality. "Gently down the stream of time," is beautiful in fancy; but in reality, it is humbug. No one ever floated "gently" down the stream of time. We don't go that way. We are pulling against the tide and constantly encountering shoals and rocks, against which our little bark is sometimes thrown with great fury. But we right its course and pull hard again. And these obstructions are essential to our very existence. They strengthen us to meet and overcome the petty perils of life. They are the great teachers that guide us to success. Let the boy take a little trip along this route,—at first with a practical oarsman,—and you fit him for the great voyage of life, and teach him to enjoy its delights and avoid its dangers.

It will also help him to overcome that awkwardness peculiar to the farmer boys, which so often points them out as desirable victims for the confidence man. It will hardly be a reasonable excuse to say you can not spare him. Make extra arrangements with this particular end in view. You spare your horses at times when you most need them. You spare the various farm implements when you can scarcely do without them, even for a day; and you do not expect them returned in better condition. You expend weeks and months of earnest toil in fitting certain favorite stock for the fair. You are anxious to have it said that you own the premium horses, cattle, and sheep. Are you not just as anxious to have it said: "Yours is the premium boy?" Fit and train him for a premium boy, and he converses freely and intelligently upon the ordinary topics of the day without being too forward. He knows what he talks about. He is fond of his book and his paper. In a word, he is a young gentleman in the true sense of the term.

Fit him for the fair. Take him with you upon your round of inspection. Teach him the points of difference between good and poor animals. Let him hear the discussions and decisions of the judges, and, if possible, assign to him some minor position of trust. He will guard it as faithfully as the soldier-sentinel his post. You must trust him to make him trustworthy. In addition to these advantages—which cost you but a trifle, and are of inestimable value to the boy—he requires special training and culture which neither the home nor the district school can furnish. His field must be widened, his facilities enlarged, his training reduced to a system.

Our State has wisely provided an institution especially adapted to the wants of the farmer boy. In it, he is at the same time on the farm and in the college; both muscle and brain are busily employed. There are opened to him the many departments of industry, science, and art, managed by skillful professors, whose lives are earnestly devoted to the grand work of moulding minds and developing manhood physically, mentally, and morally.

Give your boy the advantage of an education in this noble institution, rather than send him to the lumber woods; and though it may seem to cripple your resources at present, it will repay you an hundred fold by and by.

I might have cited before this the fact in favor of the farmer boys that their names nowhere appear upon our criminal records or loafer's list, showing conclusively that you have acted wisely with reference to some of the rules or safeguards which I have mentioned. And while we are glad that this is true, we are anxious to record their names upon the pages of history as shining examples of that broad, liberal culture, so necessary to elevate and adorn human character.

AFTERNOON SESSION.

DISCUSSION.

The following questions were taken from the table:

Question.—Do ashes on sandy soils act as direct food for plants, or as an agent in dissolving certain constituents present?

Mr. Kedzie.—Probably they act in both ways, but especially as a direct food for plants.

Question.—Does salt draw moisture from the soil (capillary action) or from the atmosphere?

Prof. Beal.—It takes moisture wherever it can get it, either from the soil or air.

Mr. Smith.—I have experimented some with salt. When applied to wheat it makes the wheat brighter and stand up straighter for a time, but it did not seem to produce any more grain.

Question.—Is the frequent stirring of sandy soils to a great depth beneficial for a crop of wheat?

Mr. Kedzie.—Stirring the soil is to be recommended in general. If the soil were very light it would probably not be advisable to stir it to a great depth.

Question.—Is there a difference in the fertilizing qualities of plaster, or is it owing to atmospheric influence?

Mr. Kedzie.—Plaster from one locality is probably as good as that from another. Plaster from one place may contain more foreign materials, such as dirt, etc., than that from another.

Mr. Escott.—When is the best time to sow plaster on clover?

Mr. Vincent.—I do not think that the plaster we use here benefits clover. I could see no difference where plaster was sown.

Question.—What is the cause of such intense heat on the surface of sandy soils, and the remedy?

Prof. Beal.—Sandy soils do not conduct heat away readily and hold heat got from the sun a long time. Something green growing on sandy soils will keep them cool and moist.

Then followed an essay by Hon. M. Brown on the subject of

BRAIN ON THE FARM.

Mr. President, Ladies and Gentlemen:

Having passed the greater portion of my life upon a farm as an actual tiller of the soil, I naturally feel a deep interest in the development of the agricultural resources of this region. Until recently the lumber interest which has hitherto been the principal industry of our people has almost entirely overshadowed everything else, and particularly farming has been kept in the background. But to-day I am happy to be able to congratulate the farmers present that the avocation in which they are engaged has asserted its right to recognition, and I firmly believe that before many more years sweep into the great past, the vast forests that to some extent cover all this region to-day will be removed by the hand of industry, and fields of waving grain be substituted in their stead.

Why should this not come to pass? There is not one person in this room who has at all observed the products of this region who does not know to a certainty that by intelligent culture no land upon earth will produce more bountifully. Our wheat, both as to quality and quantity is not inferior to any. Our oats, rye. buckwheat and all other small grains are absolutely unsurpassed. As to vegetables, I think I may safely say that northwestern Michigan excels in their production. Where can better grasses be raised than in this region? I have traveled over the principal grass producing regions of the United States and I here state the result of my observation to be that this is the equal of any. Why should not the farmer succeed here? He should succeed—nay, he does succeed whenever he labors with his head and his hands. And unless the farmer does labor with his head as well as with hands no country on this earth is productive enough to enable him to prosper. If one of your boys was intending to be a lawyer, you would send him to school, and to the best school—perhaps to the Agricultural College. Just as much as you possibly could you would do the same if one of your boys should conclude to study medicine. And if one of them should ever become impressed with the idea that he should be a minister of the Gospel, no trouble or expense would be spared to qualify him for his high calling. Oh, yes, professional men must be educated. Why, if one of your boys should conclude to become a book-keeper you would send him to some mercantile college the first thing you did. What would you send him there for? To give him an opportunity to learn the science of book-keeping, of course. But when it is decided that a boy is to be a farmer it used to be decided the same day to take him out of school. It is not so often the case now, although it is to some extent the rule yet. "It is not necessary to educate him, he expects to be a farmer." I have heard this expression many times. I believe I can truthfully say that I never heard it repeated when it did not make me angry. I hate that expression. I have detested it from my childhood. I despise it to-day. It is an expression that ought to have become infamous a century ago. This saying had its origin in the idea that labor was disreputable. That idea was annihilated by the great Lincoln when he proclaimed that the withering curse of slavery was no more, and that this fair land should be tilled only by freemen.

This saying never was and never will be true. Every person who repeats it shows his ignorance of what farming is. It is as necessary for a farmer to be an educated man as it is for a school-teacher or a professor in a college; in fact, his field of life is much broader and more comprehensive than either of these professions. The farmer has to do with many branches of science; he can not confine his labors to one or two, and the more he knows of any department of practical knowledge the better he is off. The farmer should be a student all his life in order to make success certain. I do not say that unless he is an educated man and a student he is certain to fail; but I do assert that if he is an educated man and a student he is almost certain to succeed. Now, somebody is ready to ask, What should the farmer study? In a general way the question is very easily answered. He should study farming. Every man should make a specialty of the business he is engaged in. You say, Yes, that is all very well, but what do you understand by the word "farming"? Now we have reached a question of some difficulty. The term means more than scratching the back of old mother earth without producing even a decent irritation. It means more than simply sowing and reaping. The word farming may be defined to be the science that treats of the earth, its formation, and all its products; it also includes the sciences of natural history and chemistry. Now, if I were to criticise this definition at all, I should say that it is too narrow; it will, however, answer for my present purpose. But let us verify a little, because in this incredulous age nothing is worth a rush unless it can be proved. A farmer walks out upon his farm; he sees mounds, hills, rills, and rocks, hollows, and perhaps swamps. If the owner understands geology, the science that treats of the earth, its structure and its history, these sights are his familiar friends, he knows them at once, and can to a great extent give the history of the formation of his farm, and can approximate its age. He finds, perhaps, in his corn-field or wheat-field a thousand varieties of grasses and weeds growing where he does not want them to grow. Some of this vegetation has flowers upon it whose sweet odors perfume the air many miles around. This vegetation, where does it come from? The seeds which have produced it seem to have been scattered by the broad hand of nature. It is, however, a product of the earth,—as much so as wheat or corn. If, therefore, the farmer understands the science which treats of the products of the earth, he will not only know about the crop his labor produces, but will also know something of every wild flower and blade of grass fostered and watered by Him who notes the sparrow's fall. There is no way to tell whether a bird of the air or a beast of the field is of use to man except by a reference to the science of natural history. Neither is there any way provided by which the farmer can ascertain the component parts of the soil of his farm, and thereby tell almost to a certainty what crops it will produce the most profitably, unless it can be accomplished by a knowledge of chemistry. I know that some of my hearers are ready to say that they can tell what every acre of their farms will produce best, and they never studied chemistry at all. My friend, you have by repeated experiments and at great loss of both time and money ascertained what you could have learned much easier and cheaper if you had even a very limited knowledge of the science of chemistry. You overlook the fact, too, that some knowledge of any science can be acquired without the aid of books or even of teachers. I have said the farmer should be a student all his life; so should every other person, no matter what his occupation or profession may be. How many of us have seen farmers toiling through all the long, hot days of summer, and through the cold snows of winter,—toiling on and on, and at last fail. We say of such a man, he is a poor manager. I have said it myself a hundred times: He is a very industrious man, but he is a poor manager. What is bad management? It is going through the world by guess. Such a man never thinks at all. He is just as apt to sow wheat at the wrong time and upon the wrong kind of land as at the right time and upon land which would reasonably be expected to produce a good crop. He does every thing by guess. He is a good man—his wife is a good woman (and in all likelihood a *good* manager), but he guesses along from year to year, and at last guesses out,—fails. Do not believe for a moment that he fails because he is a farmer. He would have failed as quickly in any other business. Such men always fail. They *never* succeed.

How can this sort of failures be avoided? I can do no better than to give you the rule of a very eminent man in this country. "Think out your work and then work out your thoughts." It will not require any argument to show that a person who violates the last part of the rule is in as bad situation as a person who violates the first part of it,—because, unless the thoughts are worked out, thinking out the work would be an idle and useless ceremony.

If this rule was observed by farmers they could to a great extent know in advance what the result of their ventures would be, and this is success. When the suggestions that I have made are observed by the farmers of the country then, and not until then it may be truly said that farming is accomplished by what is called skilled labor,—that is labor educated in the industry in which it is employed. The President of the United States, in his last annual message, speaking upon this subject says:

> "My recommendations in former messages are renewed in favor of enlarging the facilities of the Department of Agriculture. Agriculture is the leading interest and the permanent industry of our people. It is to the abundance of agricultural productions as compared with our home consumption, and the largely increased and highly profitable market abroad which we have enjoyed in recent years, that we are mainly indebted for our present prosperity as a people. We must look to its continued maintenance for substantial resource. There is no branch of industry in which labor, directed by scientific knowledge, yields such increased production in comparison with unskilled labor, and no branch of the public service to which the encouragement of liberal appropriations can be more appropriately extended. The omission to render such aid is not a wise economy, but on the contrary undoubtedly results in losses of immense sums annually that might be saved through well-directed efforts by the Government to promote this vital interest."

There is, however, another branch of my subject to which I wish briefly to advert. The farmer has other duties to perform besides the mere prosecution of his business of farming. He owes a duty to society which he must perform. It has been said that if a man can do nothing more than laugh it is his duty to go into society and do that. In other words, it is the duty of every man, whether he is a farmer or not, to contribute his mite towards entertaining and instructing those about him, and while a person is performing this duty he will be astonished at the amount of information he himself will acquire. There is no person in this world of sound mind who knows so little that he cannot impart some information to others. Then, too, the farmer is a citizen; he is a citizen of the wisest, and the best, and the freest government that ever existed. As such citizen he has grave duties to perform. The success of a free government, as ours is, depends upon the power of each individual citizen to 'govern himself. Those engaged in agricultural pursuits in this country hold in their hands about six millions of ballots, nearly two-thirds of the entire vote. It cannot be possible that any person would gainsay the proposition that it is vastly important that these ballots be intelligently as well as honestiy cast. Some body has said that if this country ever dies, "you can write upon its monument, killed by the people." I would rather say, write upon its monument, killed by the farmers, because they have it in their power to save or destroy it. Some one may say, yes, all this is very well, but when are we to study and when are we to do all this thinking. It is an old and I believe a true saying, "Where there is a will there is a way." The great waste of this world is the waste of time. Every body wastes more or less of it. When money or property is lost it may by industry and economy be replaced, but when an hour or a day is lost it is gone forever. How long would it take a person to read and understand ten pages of any ordinary book? Yet if ten pages are read and understood each working day for ten years, thirty thousand pages are mastered.

Why should a farmer not be an educated, thinking man? I would thank any person to give me one substantial reason. I have been unable to find one reason in my reflections and readings upon this subject. The ownership and cultivation of the soil has been the true source of dignity, of wealth, and of power since the dawn of history. Every possession is transitory. He who owns a portion of the earth has a property that is not disturbed by the fluctuations that sweep away fortunes. No, no.

"Earth, of man the bounteous mother
  Feeds him still with corn and wine,
He who best would aid a brother,
  Shares with him these gifts divine."

Many a power within her bosom,
Noiseless hidden works beneath,
Hence are seed, and leaf, and blossom,
Golden ear and clustered wreath.

These to swell with strength and beauty
Is the royal task of man.
Man's a king, his throne is duty,
Since his work on earth began.

Mrs. J. A. Upton then read a paper on

POLLY AND THE KETTLE.

I am glad to be a dweller together with you in this northern county of our good Peninsular State.

Here where once the solemn forests brooded, spreading a billowy ocean of leaves to meet the flooding light of the down-looking sun and moon as they came and went on their ceaseless course. The forests! what years of quiet had they seen; whispering and waving, waving and whispering, nursing the beauties of each season in uninterrupted peace. But the lumberman has been here, of whom our Whittier has sung: the trees are felled, and

"When, with sounds of smothered thunder,
On some night of rain,
Lake and river break asunder
Winter's weakened chain.
Down the wild March flood has borne them
To the saw-mill's wheel,
Or where steam, the slave, shall tear them
With his teeth of steel.
The brisk call of industry has been obeyed.

"Cheerily, on the axe of labor,
Let the sunbeam dance,
Better than the flash of sabre
Or the gleam of lance!
Strike! With every blow is given
Freer sun and sky,
And the long-hid earth to heaven
Looks, with wondering eye!

"Loud behind us grow the murmurs
Of the age to come;
Clang of smiths, and tread of farmers,
Bearing harvest home!
Here her virgin lap with treasures
Shall the green earth fill;
Waving wheat and golden maize-ear
Crown each smiling hill.

We are living in the early days of the fulfillment of this cheerful prophesy and we are laboring to restore the Eden which our horticultural ancestors, Adam and Eve, lost to us. With the garden went much of the knowledge and ability to "dress and to keep" it.

To "dress and to keep it" required careful observation and skillful labor, and we may well appreciate the helpfulness of those who devote their lives to the study of sciences that throw light upon these labors; chemistry in its subtle, ever-present, powerful effects, insect life as friend or foe, the wonderful workings of vegetable life, and thereby help to find the clew that will lead back through the winding ways of ignorance and difficulty to a blessed and fruitful inheritance in which shall grow every tree that is pleasant to the sight and good for food.

My thoughts and sympathies often turn into the homes now taking root here, and I wonder if the necessary preparation has been made to insure the best results for the time, labor, and money invested, not to mention our hopes, cares, and anxieties. Homes! units that make up the total of this unrivaled Republic, and every one, however humble, affecting the sum of its character. I wish by a simple story of humble life to direct your thought to what appears to me to be our need. Sheldon and Polly were long since dwellers in an humble cottage in western New York. The spring morning was breaking brightly, and Sheldon must have an early breakfast, for he was expected at a farm near by to help on the labor of the urgent spring day. Polly bestirs herself to spread the frugal meal, often peering into the kettle to see if all is right, but puzzled with its stolid indifference to the needs of the hour. It does not boil! It will not boil! The fire is assailed, and many an anxious word spoken. Sheldon with confidence that all will be right waits patiently. At length he begins to wonder and at last to investigate. The discovery was announced with startling force, for he was a bluff old Rhode Islander. "By mighty! Polly, that kettle ain't over the fire!" And sure enough, there stood the helpless kettle on the stove griddle, with never a hint of boiling; the fire burning to no purpose, and time and labor lost. Then followed a poorly prepared meal, hastily eaten, a hurried tramp to belated labor, and an uncomfortable sense all day that things had gone wrong. All this for lack of awakened thought and proper discernment of cause and effect.

Do not interpret this simple story as being in any sense a comment upon woman or womanly ability. There are many kettles not over cooking stoves, in the same useless plight, whose owners need the same earnest arousing. Polly's purposes were good; she only needed to understand and be awakened, to make it possible for her to do her best. We urge that the needs of our new homes are greatest in the direction of awakened thought and educated discernment of causes and effects. All professions and great industries demand more than a chance preparation in those who undertake them; but home-making is the great flood-tide that takes along *all* without question of previous training or preparatory drill. When the weighty and unavoidable issues of life in the home bear down upon hand and heart, many courageous women are staggered and almost overborne to find themselves so illy prepared, so destitute of resources. For lack of light and knowledge which they should have in abundance, they must grope their way and do much at a great disadvantage. The wise ones have diligently inquired for the right ways, but the disheartened have said: "I don't have any confidence in myself;" "I don't like to take responsibility;" "I don't see how I can help it."

It is easy to trace results. In all the circle of your acquaintance you must acknowledge that where best results are reached, and homes are most complete, there is felt the power of an educated mind, an awakened, intelligent judgment, and a teachable heart. If early days were not well filled with opportunity, there has been learning by the way, and constant effort to improve every stray bit of information that can be made available. This is an unsatisfactory course, but much better than none.

Reading and learning by the way has been the salvation of many a disheartened, over-worked home-maker, and I urge every woman to read. Read to keep up the equilebrium of your being. Read for new thought and helpful knowledge. Read to grow in knowledge so that you may hold the respect of sons,

"Who in their strength elate,
Challenge the van and front of fate."

and daughters who ever need the wise counsel and sympathy of intelligent mothers. There have been times and places in which there was as bitter persecution of a reading house-wife as it was possible for individuals to carry on under this dispensation, but the reading has blessed the world. Never suffer the blush to mantle your cheek as if you were a culprit because you are found reading. If doubling the growth of grass blades is meritorious surely praise is due to her who multiplies thoughts and ideas. Appreciate yourselves; *your own* needs, as well as the needs of your families. I read a little history not long since of seven women in humble toilsome life, who banded together to study, and these are the words of one of the number whose hair is whitened with fifty-two winters: "I really don't know what would have become of me if the society had not happened when it did" said she, with tears in her eyes. "When I was fretted with our money troubles and tired with my work, I would sit down in my big chair and read our next lesson, and try to think what it meant, and somehow the load would melt away. If I did not read more than ten minutes I felt refreshed." The woman in the farm-house needs to be better supplied with substantial education before she takes up the duties of her lot than any others; her equipment in physical and mental qualifications should be as complete as is possible. The ancient Athenian matron believed it to be a high compliment which she paid to her Spartan visitor: "O, dearest Spartan! Welcome. How beautiful you look; how fresh your complexion. You could throttle an ox!" This home makes it necessary to be able to throttle something more formidable than the patient though powerful ox. The ignorance and vice of the old world is often drifted in upon her own hearth-stone. It is possible that the farm-hand may smirch her boys with the accumulated filth of generations, and there are numberless shapes of vice and wrong that she must be powerful and vigilant to contend against.

She is isolated, and must of necessity be left much to her own resources of thought for companionship. She is where her influence will be felt upon the mind and character of the great middle class in this republic, and she will more often be called upon to meet emergencies in her own strength.

We who stand to-day in the midst of the never finished duties of our homes know that a crowd of callow youths are about us, eagerly looking forward to life, and unless wisely restrained, will set out early in the great business of home-making, to repeat the experiment of using untutored heads and undisciplined hands. What can we do for our daughters and sons that they may be better prepared to live? that they may have a larger lease of life's real good? that they may not be so nearly ready to die when they have just learned to live? Fathers and mothers hurried and worried with the duties of each day are not competent to do what is needed, and the common school will by no means supply the lack. We shall perhaps call in question our own good sense and sanity when we review what we have done through our representatives in Lansing. An appropriation of $30,000 was made to establish a reform school for our criminal girls, while a bill based upon the request of our State Board of Agriculture that an appropriation be made of $10,000 to build a hall for ladies, $2,000 to furnish it, $1,000 for lady teachers' salary, and $600 for matron's pay, making a total of $13,600, so that our virtuous daughters might be given equal opportunities with our sons at the State Agricultural College, was lost. The reformatory for our criminal girls is quite right. I helped to circulate the petition, and found our tax-payers prompt and willing to do as much for criminal girls as had been done for the same unfortunate class of boys. The justice of this was cheerfully conceded, and I am quite sure if our sensible tax-payers were brought face to face with this other proposition, they would not hesitate to do as much for our intelligent, self-respecting daughters as they have for the criminal class, and fit up for them a place for culture and learning at the State's expense quite as liberally as they have provided for the honorable sons. There is perhaps at first a hesitation on the part of some about sending our daughters with our sons to an agricultural college. It is no unusual circumstance to find boys and girls associated in agricultural labors. Why not be associated in the studies that pertain to those labors? The State of Iowa has led us in this line of education, and the young ladies have practical lessons in all that pertains to household economy and work, bread-making, cooking of meats, laundrying and such like, besides the studies of the course. Let us as wise citizens give support to and urge on this plan of appropriating from our State Treasury for the education of our daughters. We commend the noble woman who presides at the White House in Washington, and believe she does credit to the nation. Our good sense teaches us that although she might be a woman of honor, and possessed of the best of purposes to do well, still lacking culture and education she would make but a sorry and bungling pass before the world. If the woman needs years of preparatory experience before she can well attend to the duties of this white house for a term of four years, how can we deny to women who must preside for a lifetime in the white houses of our State and county some years of study and opportunity to become fitted for such a place of trust? Do you begin to count the cost? You are very rich if you can meet some expenses that we know of. Provide the place for learning, give your daughter $150 or $200 per year, and see how well she will make it serve her. You will perhaps be encouraged, too, when you remember that the daughter will cheerfully work for her board, do her own washing and ironing, and make and keep most of her clothing in repair. The boys are very few who mend their own clothes.

I fear I may be trespassing upon your valuable time, but ask your attention for a few moments more. Polly has become anxious about a *kettle* that does not boil, and begs your consideration of its helpless case. It stands with very long, old fashioned legs, upon a very thick griddle. The impatience of those who wait, not for breakfast only, but for all the food that should come into their lives, and prepare them for the duties and privileges of these urgent days is beginning to be felt. Money is invested, fuel supplied, much valuable time and strength employed, still labor is belated and the kettle does not boil. The urgent spring day of our county history is upon us. Polly has patiently waited hoping all would be well, but her anxiety grows as the time goes by. I refer to the consumption of tobacco and drink.

Sheldon often complains and judges that his prosperity is one-armed and lame in both feet. Give Polly five or ten cents every time Sheldon takes a smoke, or a chew, or a drink with a friend; suffer her to lift the griddle and add it to the fire, and he will be convinced that his prosperity has lost its last arm and has no feet at all. Polly, however, is too wise for this; she knows too well that the milk-pans are failing, and the brown towels giving out. She sees too distinctly the relation of dimes to the thousand home needs. Polly is beginning to realize deeply that the smoke is continually going up from this altar of self-indulgence and is anxious to see the relation of the kettle to the fire changed. Polly has discovered that in this country there is a direct line from the individual to the state, and her belief is, that as tobacco and drink never enrich or profit the individual, so states must of necessity be impoverished as individuals are in their use. Polly can see that our criminals cost us enormously, as witness the expensive trials they must have, the costly houses they must live in, the free rides they get, and the care that must be taken of them; and after all, their worthlessness to the State. Also as witness the $30,000 appropriation for our criminal girls. She considers what homes these criminals that the State must care for swarm forth from, what fathers and mothers they had, and is too shrewd to expect "figs of thistles." She sees that squalid poverty and groveling ignorance are never without their tobacco and strong drink, and that criminals are almost without exception always steeped in both. Polly often ponders the question "Would any traffic be long tolerated by our people that would so deteriorate our farm stock,—the firey young colts, the innocent young cattle, the profitable sheep, or even the choice, fancy poultry, making them such a public charge, and after all so worthless?

Ladies and gentlemen, these are matters that reach to the very core of every home in the country, and we believe that the caution and carefulness that prompts you to construct laws against Canada thistles, that arouses you to protect with law the fish in our streams, and the birds and deer in our forests; the kind, thoughtful care that provides that our public doors shall swing the best way so as to avoid trouble in case of fire, will, when properly awakened to the needs of the times, prompt you to lift swiftly the thick griddle of ignorance and indifference that is in the way of *our kettle* and close the chasm that now divorces our gains from their best uses. We will work for the day that shall so educate both Sheldon and Polly, and so arouse their unawakened senses that both shall fully understand and appreciate the needs of their lots and labors, that they shall promptly and cheerfully put the *kettle over the fire*, and so help on the stability and usefulness of our new homes. "Happy is the people that is in such a case."

Mr. G. W. Warren then read a paper on

CULTURE, COST, AND VALUE OF ROOT CROPS.

It appears to me that one of the important questions for us to consider in the future is what crop, for feeding stock, can we raise with profit, and how we shall keep our stock well without a large amount of hay and more cheaply. I shall not attempt to give you any well-written or cultured address, but a few practical thoughts gathered from experience. I believe nothing better and more profitable than roots for winter and spring feeding, especially when fed with good straw and corn-stalks.

Fitting the Ground.

Very much depends upon how well and *when* we prepare the soil. It is much cheaper and easier to fit the ground properly before seeding than after. If not in sod there should be applied a good coat of manure before plowing. Plow deep and in the fall. Soon as the ground is in suitable condition in the spring harrow and cultivate well, working into the surface soil a good top dressing of well rotted manure. Just before sowing give another harrowing and roll or smooth the ground, making the surface fine as possible. I think once plowing better than twice. If sod or manure is plowed under in the fall or early spring it should remain deep in the ground to attract and receive the tap root to the end that the beet or carrot may grow long and straight. Every time we plow we have to contend with a new crop of weeds, and if the foul seeds first plowed under are not disturbed we are not troubled with them during the season, only such as are near the surface will germinate; many of these are destroyed by the last working before planting.

Selection of Seeds.

It is very important to select good seed. Much of our labor in fitting the soil will be lost, and money also, if the seed proves poor. I have always been well satisfied when sending to D. M. Ferry & Co.

Variety.

My choice is the beet or carrot. They will yield more bushels per acre than the turnip and are more valuable; are less liable to be injured by insects; milk will not be tainted as with turnips, and are more easily prepared for feeding. For hogs they need no cutting. Never had breeding stock do better than when fed roots during March and April.

Sowing.

All things being ready and weather warm, about the 20th of May, take the garden drill, with marker attached, and sow in rows 18 inches apart for hand-tillage and 30 inches if the horse is to be used. My drill marks the rows, drops and covers the seed, and rolls the ground all at once. Sow quite thickly and thin out. Should there be open spots fill in with the White Flat Dutch Turnip.

Culture.

Do not wait too long before beginning to cultivate. Even before the plant can be seen the drill marks may be followed, and a shallow working between the rows will be found profitable, as they get larger, work deeper and closer. The thinning out can be quite rapidly done by cutting at right angles to the row with a sharp hoe, leaving a few plants to be pulled by hand. Beets may stand from 10 to 18 inches and carrots 8 to 12 inches apart, according to strength of soil. The oftener they are worked the better, and should not be left to themselves until the leaves shade most of the ground.

Harvesting.

Beets and carrots should be gathered before very heavy frosts. A little feezing may cause the top to become hollow and soft. A potatoe fork is very valuable for loosening the ground, after which the root is readily out with the hand and the top broken off before laying it down. They will keep better and be nicer at time of feeding if allowed to dry a little before pitting. The beet or carrot will withstand a very dry season even in light soil, but the yield will vary, of course, according to the surroundings. With rows 30 inches apart and the beets 18 inches in the row there would be about 11.500 plants to the acre. These will weigh nearly all the way from 2 pounds to perhaps 15 or 20 each. The few before me weigh from 3¼ to 7¼ pounds. I have raised them, on my light soil 22 inches in circumference, 24 long, weighing 17 pounds. If the average weight was 5 pounds we would have about 57,500 pounds, or 958 bushels per acre. I figure the cost of production as follows:

Once plowing	$2 00
Harrowing and cultivating	3 00
Seed	2 50
Drilling	1 00
Eight days' tending	12 00
Pulling and pitting	12 00
Manure	12 50
Total	$45 00

Alowing only 450 bushels per acre the cost is but ten cents per bushel. A yield of 750 bushels would reduce the cost to six cents per bushel.

Upon the relative value of roots for fattening purposes, as shown by analysis, I will not dwell, but my experience in feed to breeding or store hogs is that beets or carrots fed once each day are worth fully one-third as much as corn. I would advise every one present who keeps a cow or pig to sow beets or carrots for winter and spring feeding.

At the conclusion of his paper, Mr. Warren called attention to some specimens of the Snow Flake potato, and asked for the experience of those who had tried this variety.

Mr. Escott.—I have raised this variety, and have only one fault to find with it: there is apt to be in each hill a large number of small potatoes.

Prof. Beal.—At the College we have tried a large number of varieties of potatoes, and we think the Alpha and Early Ohio for early, and Brownell's Beauty and Beauty of Hebron for late, are the best.

DISCUSSION.

What is thought of a prepared manure as follows: gypsum or plaster mixed with ashes and hen manure, and allowed to stand five or six months before using?

Mr. Kedzie.—I do not think it advisable to make this mixture. The alkali of the ashes would set ammonia free from the hen manure which would escape. I can see no advantage in mixing with plaster.

Prof. Beal.—As good a way to compost hen manure as any is to mix it with dry, loamy soil.

Question.—Is barn-yard manure better plowed under or applied to the surface?

Prof. Beal.—Harrowing it under will probably give as good results as any way.

Question.—What is the best breed of sheep, all things considered, for this region?

Prof. Beal.—It is difficult to tell. Depends largely on whether mutton or wool is wanted. In general I would recommend the American Merino.

Question.—What breed of cattle is best adapted to a mixed system of farming?

Prof. Beal.—I cannot say. Each breeder thinks his breed is the best.

Question.—In what way does a plant derive aid from the use of plaster?

Mr. Kedzie.—Plaster acts as a food for plants by furnishing it with lime and sulphuric acid, both of which the plant requires. Plaster also probably acts on the vegetable matter of soils, and converts a portion of it into ammonia for the use of the plant.

A TALK ON FARM INSECTS.

BY PROF. BEAL.

The professor said he would not give any set paper, but would give remedies for any farm insects of which the audience would like to hear. The first insect discussed was the squash bug.

Mr. ——.—I kill the squash bug by catching them on boards.

Mr. ——.—I dust sulphur on the plants. The bugs don't like it and leave.

Question.—What is the insect that is on the under side of turnip leaves?

Prof. Beal.—Plant lice probably. Whale oil soap made into a strong suds, and thrown on the under sides of the leaves is probably the best remedy.

Question.—How about the cabbage worm?

Prof. Beal.—It is a foreign worm. The majority of our insects are foreigners naturalized. They do better here than in the old country because their enemies have not come over with them. But few cocoons of the cabbage worm will hatch this year,—the parasites have destroyed so many of them. Mr. Skeels, a graduate of the College, found that only 40 cocoons out of 500 that that he had gathered were alive. The rest had been eaten by parasites.

Mr. Rose (Editor Pioneer-Magnet).—A German lady recommended my wife to sprinkle salt on the cabbages. We tried it and raised good cabbages. A soft sluggy worm has been feeding on my cherry and ash trees. What remedy would you recommend?

Prof. Beal.—Sprinkle dry road dust over the trees. That will use them up.

Question.—What remedy for the currant worm?

Prof. Beal.—White hellebore is good.

Question.—How can we destroy caterpillars in apple trees?

Prof. Beal.—They may be destroyed with a shot gun when they are in their nets, or they may be wiped out.

Question.—Are the tent caterpillar in apple trees the same as those on the wild cherry?

Prof. Beal.—Yes. They are more fond of the wild cherry.

EVENING SESSION.

"Horticulture at the Agricultural College." By Prof. W. J. Beal. (See lectures at more than one Institute.

Sherman Upton, of this city, who is a student at the Agricultural College, followed with his "College Life Illustrated," embracing a series of cartoons and crayon sketches. They are admirably executed, and humorous and ludicrous in the extreme, showing both talent and originality in design on the part of their author. The display of cartoons created much merriment, and constituted a very appropriate closing chapter of the Institute.

President Vincent spoke briefly, congratulating the farmers of Mecosta county, on the success of their Institute, after which resolutions were unanimously adopted, tendering thanks to the Agricultural College, Professors and others from abroad, for their assistance and instruction; to the Glee Clubs for their music, and to the people of this city for entertaining visitors, when the Institute was declared adjourned.

MANCHESTER INSTITUTE.

The farmers in the vicinity of Manchester took a live interest in this Institute. The commodious hall in which it was held was well filled at all the sessions. In the morning most of them, with their wives, came to remain during the day and evening, bringing baskets of provisions from which a sumptuous repast was spread in an adjoining room, and partaken of during the noon and evening recess.

The committee on music are especially deserving of praise for the very excellent music furnished on the occasion.

After the usual opening exercises, President G. D. Rose gave the following address:

Ladies and Gentlemen:—We have met here this evening to talk over the different topics mentioned in the programme. By relating our own and listening to the experience of others, which may have varied somewhat from our own, we may reasonably expect to be benefited.

This is the second Institute held in this place. The one held here two years ago gave general satisfaction and those attending seemed pleased and profited by the exercises. We hope it will be so again.

Gentlemen of the Agricultural College, we welcome you to our Institute. As men of science and practical experience we will be glad to hear from you, thinking perhaps you may throw some new light on the science of agriculture which will inspire the farmer with new life.

Fellow citizens, we welcome you all who have come to attend our Institute, hoping you will feel at liberty to take an active part in our discussions; not be listners only, but talkers also, for we claim there is no position that man is called to fill in which there is more room for improvement than that of farming, not only in tilling the soil, but also in economy. What I mean by economy is not to deprive one's self of the necessaries or comforts of life, but to use our products to the best possible advantage. Some men economize in one way and leave the gates all open in others. I presume there is not a farmer among us but that will say he has lost enough this last season in not doing his work in season or in the proper manner to have hired another hand three or four months. Once more cultivating or once more harrowing might easily give an increase of a bushel or two to the acre. We are wasting labor and capital unless we make the farm produce in full according to its capacity.

Suppose you add to your average one or two bushels to the acre and one pound of wool a head on your sheep, how would it affect your balance sheet? Washtenaw county stands only second in her average of wheat in the two southern tiers of counties, being an average of 21¼ bushels. Almost every farmer will tell you he might have raised a little better crop, even if his crop was ever so good, if he had prepared the ground better or sowed some other kind of seed. If our average had been about one bushel more we would have been the first. To talk of one bushel to the acre seems small, but take it right in your own town. Manchester, Sharon and Bridgewater raise about 10,000 acres each of wheat; one bushel to the acre would make 30,000 bushels in these three towns—at present prices nearly $40,000. That would pay a big store bill. Add the same to other crops year after year, what might you have been worth to-day with the time you have spent in farming by practicing economy on a small scale?

Farmer B. goes to town to trade; he buys twelve yards of calico. The merchant asked him seven cents a yard, but by shrewd argument and long entreaties he buys it for six cents. The merchant has not made one farthing on the sale, but lets him have it thinking to get another chance at him. The farmer goes home thinking he has saved or economized twelve cents on the calico; but what does he do when he gets home? The hogs are to be fed; he takes a bushel of corn and throws it into the mud for the hogs to eat. They don't get but half of it, which is twelve cents—all he saved on the calico. And this is not all; when those hogs go to bed there is not one straw for twelve or fourteen hogs to lie on; they grow poor every day; he says they are not a good breed, or have got the distemper, or something is the matter. Next he goes to the barn to fodder and feeds in a similar way that the hogs were fed, having no rack to feed in, scatters around the yard; cattle and sheep stamp it into the mud, don't eat half. When winter is over he has wasted enough to have bought more calico at seven cents a yard than his wife could have worn out in ten years, or enough to have dressed his wife in first class style the year round. Now this is only one of the instances of economy in small things that a farmer can practice. Let us look at this matter squarely, with a view to improve our methods, and the addition to our income thus gained will surprise us.

T. C. Abbot, President of the Agricultural College of Michigan, gave an address on "Manual Labor in the Michigan Agricultural College." (See lectures given at more than one Institute.)

Mr. Geo. S. Rawson read the following paper:

THE FARMER IN SOCIETY.

In an occupation which contains about one-half the population, and so large a portion of the entire wealth of the nation, it is certainly to be expected that we will find all classes of minds, all grades of society, and all degrees of intelligence. Nor does the occupation of the farmer differ, in this respect, from that of others. Human nature is pretty much the same throughout all trades and professions. But the farmer's life differs in some respects from that of all others. His is, perhaps, a more isolated existence. He is brought more in contact with nature, and less, it may be, with the treachery of man. His companions, outside of his own family circle, and his help, are to some extent, domestic animals, which never sink to the degradation of which man is capable. The haunts of vice, which infest the large cities, he sees only through the public press. If he deals fairly with mother earth, starvation never stares him in the face. He may be a bad character, but if so he is such in spite of his surroundings.

It is not our purpose to exalt the business of farming above that of any other avocation in which men are engaged; but the time has certainly gone by when it was considered the business only of the dull, uncouth, and ignorant. There are many bad men, and ignorant men in its ranks it is true—if you can produce worse, heaven pity your production; but we believe there is too much of a tendency to judge the whole by the few. There are many who forget the noblest efforts of the clergy to make men better; because one man in a thousand falls. They have only curses for the whole legal fraternity, though one in ten is honest—probably. They will denounce the merchants in a mass, because some are addicted to giving false weights, and avoiding truth as a leper.

There are many, of whom the farmers have their full share, who will denounce the railroads without stint, though they bring wealth and comfort to their doors. They would have consigned all the middle men, so-called, to oblivion, though they are among the most important and useful members of society. Unfortunately there is no occupation but that contains its drones; no creed but that contains its hypocrites; no party but that suffers from selfishness of its own members; no government without its traitors. But compare the farmers, as a whole, with other classes, in perseverance, industry, intelligence, wealth, and good citizenship, and we do not believe they will suffer by the comparison. As a moral power, their weight is felt and heeded. They are aggressive. The improvements for their benefit have kept pace with the improvements of the age. The rugged schooling, the solitary thoughtfulness, and the habits of industry, inculcated in the farmer boy, have given to other professions a large share of the most successful business men, of the best writers, of the soundest thinkers, of the ablest statesmen, of which any age can boast.

But we wish more especially to speak of a few certain classes of farmers, and while we see fit to criticise, we by no means claim exemption from that criticism ourself. On the contrary, we feel a considerable degree of guilt, hoping that in the discussion of habits which may be common, we may be mutually benefited. You will doubtless understand that those certain classes are not confined to farmers altogether, but it is sufficient for our purpose to confine our remarks to those within our ranks. It has been said by some one that the first thing that an Englishman does when he comes into the world is to grumble. There are a good many farmers who seem to be like the Englishman, born grumblers. One particular object of their wrath is the weather. We doubt if it could be made to suit even if it were made to order. They are like the old deacon who in time of drouth prayed for an old fashioned drizzle-drousle, and when it came was considerably emphatic in saying that he didn't mean to have it rain forever. He is the same chap who annually discovers that all the peaches have the yellows; that the moths have blasted what little hope there was left of a crop of fruit after the frosts of winter. He will tell us that the insects have destroyed half the wheat, that the winter has killed another half, that another half has been destroyed by wind and hail, and that what there was left didn't half fill, and then he'll go to work with a quiet conscience and harvest thirty bushels to the acre. His next failure he announces is from its enormous growth. He never lost a cow or a horse but that it was the best he ever had. If he sells an article and the price goes up, he is mad because the other party to the trade has made something out of a risk he dare not assume; if the price goes down, he is nearly as mad because he has lived so long and hasn't learned how to do business before. If his neighbor lends him a little money and then wants it back when he agreed to pay it, he feels offended, and is apt to think that all men who receive interest are pirates. His disposition is such that it makes him envious. His prosperous neighbor, who perhaps is more economical, more industrious, more temperate, or it may be, by better judgment, has outstripped him in the race for competency, he looks upon with feelings that are not altogether friendly. He believes that all financial success in life is the result of luck, or extortion, the former of which never smiled upon him, but he is always the victim of the latter. He cannot understand that success, in its true sense, is only achieved through a reasonable economy, strict devotion to business, and a liberal exercise of brains. His grievances seem so hard that he believes all occupations are arrayed against his, though the prosperity of both theirs and his is one and inseparable. Now what is the use of inflaming our imaginations with trouble which does not exist, or of mourning over that which we cannot possibly prevent. It destroys hope, slackens energy, shortens life, and makes it burdensome. The transposition from this class to that of another is exceedingly easy. We mean the class who, though rich, are exceedingly poor. They may own houses and lands, and stock and tools, and yet they are poor. They may even possess money, and bonds and mortgages, yet all only adds intensity to their poverty. There is nothing in existence that is poorer, unless it be the man who owns nothing but thirteen children and two dogs. Too poor to put a dollar into a public benefit, whether it be a school, a church, a social gathering, a farmers' institute, or any public enterprise which is to benefit the health, morals, or intelligence of the community in which they reside. Too poor to pay their just portion of the public tax, and the supervisor who has taken a solemn oath to perform his duty, out of sympathy for their poverty and affection for their votes, is exceedingly careful to excuse them. Grim visages of want haunt their manhood, and old age brings no remittance from their toils. With them, to accumulate is the ruling passion, and you have heard that

"One ruling passion in the human breast,
Like Aaron's rod, swallows up the rest."

We cast no reflections upon economy, for it is one of the noblest of virtues. It is the only thing which gives men competency, their families comfort, and their old age ease. But there is a vast distinction between economy and stinginess. The one is the very strength and stability of a nation's life, the other is the drag and hinderance to all public good. Economy fosters and supports, by a judicious expenditure, whatever tends to fill the land with comfortable homes, intelligent families and a contented yeomanry, and to establish laws which regard the rights of life and property as a sacred trust. But stinginess would refuse aid to the very means by which its own selfishness is satisfied. Economy provides the means and the disposition to build institutions of charity. Stinginess has no sympathy with their object, nor is willing to contribute a dollar to their support. Those who belong to this class can see no reality in the language of Pope, who exclaimed:

"Oh, Happiness! Our being's end and aim,
Good, pleasure, ease, content, what is thy name?"

Sordid, selfish avarice has full possession to the last. Like the skeleton that was exhumed at Pompeii, with clenched fingers around a bag of gold, they are ever grasping, even though health, comfort, pleasure, all, are alike sacrificed in the greedy race for more. How much better, it would seem, when a sufficiency had been accumulated, and the vigor of manhood had passed, should they surround their homes and firesides with the comforts which a life of honorable industry had deserved.

"How blest the man who crowns in shades like these
A youth of labor with an age of ease."

Ambition, under the control of reason and a sense of right, is a valuable possession, but it may become a cruel tyrant when it has obtained the mastery. The ambition to add another farm to one already sufficiently large, by shouldering an enormous debt, a debt which must be cancelled by excessive labor, both manual and mental; by a too rigid economy, by a manner of living which will cause your sons and daughters to dislike the farm; in short, which makes you nothing less than slaves, is an ambition we think not to be commended.

Better give your children more time to study, though you leave them an inheritance of less acres. Instill in them habits of industry, without making it drudgery; teach them economy, without parsimony.

There is another small class of farmers that we approach with feelings of the greatest delicacy, and that is the class known as the farmer politicians. If you suceed in finding a first-class representative of this variety you are pretty apt to find a first-class failure as a farmer.

Now the faithful, conscientious study of the political questions of the day is one of the highest duties of citizenship, that the ballot, in the hands of the voter, may be an instrument of good and not of evil. And for him who without asking it or stifling his convictions, is placed in positions of trust by the suffrages of his fellow citizens, and who fills that position to the best of his ability, we have nothing but feelings of profound respect. But there is many a farmer who has seen his family neglected, his farm become unproductive, and finally mortgaged in the petty scrabble after office. Such a one never wants office, it is true, but he never declines. He's a capital good fellow, a good hand-shaker, free with his cash, cares only for the honors; like the Irishman who was running for the office of constable, who declared that "he didn'nt care anything about the office, but 't would give him notoriety abroad." He feels that his time and talents belong to the public, and he fears that the public may fail to assert its owership. The man who can think and act successfully upon many things at a time is the exception and not the rule. If his mind is always dwelling upon the action of the party's caucus, it will naturally be drawn away from the care and profits of his stock and fields. The professional man who reaches eminence in his profession is the one who makes the study of that profession his principal life-work. Not that farmers shouldn't have anything to do with politics or political meetings, for that would just suit the political dead-beats; but that there is nothing gained by being so absorbed in the petty wrangling after office, to the exclusion of everything else, that in the end they have nothing but the satisfaction of being political dead-beats themselves. Hunt out fearlessly and independently the political evils, whether they be men or theories, and apply the remedy, and you have performed the highest duty that accompaniess the ballot. With a universal disposition to first excel in some honorable employment, there will be but little danger in American politics.

The slack farmer. Probably all sometimes train in his company. With all the improvements for saving labor, still there seems to be no decrease in the amount expended. Wants have outgrown the simplicity of early days. Cares accumulate. New markets are opened, which must be supplied. One farmer must get his produce into market as cheaply as his neighbor, or fall behind in prosperity. The law of competition, though just, is rigid and exacting. The man who thinks to defy the spirit of the age will certainly be overwhelmed. He must adopt the new improvements and new methods, and raise more and better, or somebody will ride over him rough shod. He must measure forces with shrewd and experienced men. In the battle for bread, pluck, energy, and good judgment win the day. It is no wonder that amid all this push and bustle men sometimes feel compelled to sacrifice order and neatness. But there are those who are habitually negligent. They are forever toggling up instead of repairing or making new. Their crops are never put in in season, and they are harvested equally as promptly. They will drive stock out of their crops a hundred times in a year, rather than make a fence that will turn them. They won't build a gate, though they must let down the fence every day. Their buildings are put up and managed on the "anything will do" principle. They will lose more than ten per cent on the capital invested in farm implements by leaving them exposed to the elements, when a few days' work and a trifling expenditure of money will save it all. Instead of trying to get their stock to eat all they can, they try to winter them on as little as they can and have them live. They don't believe anything pays, and consequently don't want to spend much time bothering with it.

Some put no thought to value upon building up and maintaining an untarnished credit. Now a credit system has always existed, and we think, in the very nature of the case, always will, and he who fulfills promptly and to the letter, every contract that he makes, whether it be the payment of money or the completion of a bad bargain, will eventually establish such a faith in his honor and credit that even in a moneyed sense he has a most valuable possession. No one whose promise is without value, can reap advantage in the ups and downs of trade, or be able to bridge over the chasms of temporary want. He can't buy nor sell and compete against integrity. He is avoided by the careful and not trusted by the shrewd. A man can lose money by bad investments and yet profit by the experience, but he can't mar his reputation and find total recovery. If one must be slack anywhere, the matter least of all (in a business view) in which it can be afforded is a matter which affects his promises to perform.

In thus referring to a few special classes of farmers, we think that the great mass of the many millions who have converted a land of forest and prairie into a land of homes have not been included. The generous hospitality and steady character of the pioneers have stamped indelibly their image upon succeeding generations. We believe that the science of agriculture is but little beyond its infancy, as compared with what it is yet to be. There are a hundred agencies at work tending towards its financial and intellectual improvement. The press and common school have nowhere more earnest supporters than among the farmers, while schools of industry have reached a degree of eminence that silences the vituperation of their enemies. That system of farming is no longer called successful that robs earth of its fertility and gives nothing in return; that recompenses rich harvests by entailing upon the next generation lands which will support only a poverty-stricken people. Science and practice are working together to counteract the impoverishing system of by-gone times and restore to their native richness lands so nearly made desolate. This means better farmers, better profits, more systematic and intelligent farmers. Unlike the tenant system of the old world, each owns a portion of Nature's broad domain and has a personal interest in its permanent improvement. We need have no fear of the position of the farmer in society. He will be measured by the same standard as other men. And that standard rightly set up is earnest effort, thorough culture and a pure morality.

Mr. J. D. Corey read the following paper:

HEDGE FENCES.

The universal practice of the agriculturalists for ages past, is sufficient proof that some kind of fence is a necessity to the farmer. It has long since been found necessary for those engaged in tilling the soil to have some barrier to protect their crops from marauding animals, and also to restrain their own within reasonable limits, and upon their own premises. Hence, we conclude that fences of some kind must be erected and maintained in our country, in order to raise sufficient food for its inhabitants. The question then naturally arises, what kind of fences shall we build? This, I apprehend, is a very difficult question to answer. Where timber of good quality is abundant, or where stone is an incumbrance to the soil, these materials might be used to good advantage. But a large portion of our vast domain is almost entirely destitute of these valuable products. Even in our own State, many locations are already nearly destitute of timber, and the ruthless ax is producing sad havoc among the primeval pine forests of the northern counties. Some farmers are making ditch, and others, wire fence, but as yet no substitute has been found to take the place of the rail and board. Very few persons have any adequate idea of the immense cost of fencing the tillable lands of this country. It has been said upon good authority that the fences in the U. S. have cost more than all the buildings. At a moderate estimate they cost, annually over $150,000,000. In the State of New York, alone, more than $10,000,000 is required for their support. The amount expended in the State of Michigan every year, is probably greater than the original amount paid for all the enclosed land in the State. In order to more readily appreciate this vast outlay, we will premise that every farm of 160 acres, ought to be fenced into 20 acre fields for convenience and profit. This would require 960 rods, or three miles of fence, which would be twelve miles, or 3,840 rods of fence for every section of land enclosed; multiply this by 36, and you have 432 miles, or 138,240 rods of fence in every improved township. Again multiply this by 20 and you have 8,640 miles or 2,764,800 rods of fencing in the county of Washtenaw.

A few days since an intelligent farmer belonging to the Manchester club informed me that he owned twelve miles of fence which was worth one dollar per rod; that sum probably being about the average value, would give $138,240 as the present worth of fences in this town, and $2,764,800 as the amount now invested in Washtenaw county. In this estimate no account has been taken of road fences (which are almost wholly unnecessary), or of those around gardens, yards and orchards, and in villages and cities, so that the actual value is much greater than we have computed. Now, it is very evident that the present fences around and upon our farms cannot be rebuilt with the same material without a greatly increased expenditure, in consequence of the enhanced value caused by the increasing consumption of timber.

We now have nearly 100,000 miles of railroads. The annual consumption for ties alone is probably 50,000,000, or 30 years' growth of 80,000 acres of timber. To fence these roads would require 150,000 miles of fence. We have, perhaps, about the same number of miles of telegraph, which would require 1,000,000 trees, while the annual repairs must take 400,000 or 500,000 more. The little lucifer match consumes annually in its manufacture over 300,000 cubic feet of the best pine. The brick that are annually burned require more than 2,000,000 cords of wood, which would take the entire timber from 50,000 acres. Shoe-pegs are important articles, and to make the requisite annual supply consumes 100,000 cords of fine timber, while the manufacture of lasts and boot trees takes 500,000 cords of maple, beech and birch, and about the same amount is required for plane sticks and tool handles. The packing boxes manufactured in the United States six years ago amounted to $12,000,000, while the timber manufactured into agricultural implements, wagons, etc., was more than $100,000,000. Our consumption of timber is not only constantly on the increase, but our exportation of it is also rapidly increasing. Our staves go by the million to France annually; walnut, oak, maple and pine in large quantities to England, and docking timber to China and Japan.

From the foregoing facts and figures, we come to the conclusion that before another generation has passed away the State of Michigan will be entirely denuded of its beautiful and valuable forests. What, then, shall we do to replace and rebuild our present fences? I am of the opinion that we should commence immediately to grow live fence. Its cheapness, its' durability, and its perfection and beauty demand its almost universal adoption where fences are to be permanent. The expense of enclosing a farm with a hedge is less than one-half what it is with timber, while they rot in a few years, the hedge will grow better for many years, and all the time, in winter and summer, in storm and calm, remain a protection and ornament to the farm, and will probably endure for generations. Experience and observation has shown us that there is no better plant for this latitude, where a fence is wanted for protection, shelter, and ornament, than the Maclura, or osage orange. The maclura is a free grower, with formidable and numerous strong and sharp thorns; it will not spread and will bear repeated and severe trimming, all of which qualities are necessary in a hedge plant. As it is much cheaper to purchase the plants for setting in the hedge row than to raise them from the seed, most farmers do not attempt to grow them. After preparing the ground by plowing a back-furrow about ten feet wide, and cultivating in such a manner as to have it in good condition for planting corn, you are ready to plant the hedge. Stretch a line along the center of the plowing exactly where you want the fence, then select those plants which are of uniform size, cut off the tops close, or within two inches of the yellow or root bark, leaving the root eight or ten inches long, then with a clean, sharp spade or dibble make an opening in the ground and insert the plants therein, close to the line, about an inch deeper than they stood in the nursery, and not less than twelve inches apart in the row, packing the earth firmly around every plant. To facilitate this operation you may take a board five inches wide and one inch thick, around which wind your line smoothly until you have used five or six rods, paint the cord along the center of one edge of the board, and the line is ready for use. In setting the hedge place a plant against every paint mark, and you have sixteen plants in every rod, which will cost you about four cents, and it is said an able, active man will set a half a mile in a day, or 2,560 plants. After planting as above directed, the hedge should be carefully cultivated and kept clear of grass and weeds until it is at least three feet wide at the base and four and one-half or five feet high. In the spring of the second year all vacancies should be filled with plants of a greater age and better size than those in the hedge row, and at the same time the entire hedge cut off within at least two inches of the ground. This can be well done with a sharp mower. After this cut off the strongest plants so as to keep the growth of all equal and of the same height, and continue to do this two or three times every year until you have the most perfect fence that ever adorned a landscape. If a row or two of potatoes or turnips are planted on each side of the hedge they will generally pay for cultivating without injuring its growth.

Our agricultural societies ought to give a premium for the best hedge. Hedges on lines between farms would prevent much litigation, encourage morality, and in some instances, perhaps, lessen profanity. Every farmer ought to try the experiment with a few rods, and when all have permanent fences the leak is stopped that prevents the farmer's cup of bliss from running over.

DISCUSSION.

Mr. Fellows said he had faith in the utility of hedge fences, but doubted whether the method of cultivation recommended by Mr. Corey would result in a fence that would be a sufficient barrier to cattle.

Mr. F. A. Gulley said they were experimenting at the Agricultural College with a variety of hedge plants, but hitherto they had not been successful with the osage orange; it did not grow well there.

Secretary Baird said that so far as he had observed comparatively few of those who had attempted to raise the osage orange hedge in the eastern part of this State had been successful. A few had persevered and succeeded to some extent, but more had abandoned the attempt after a few years. He hoped that before our timber had become so scarce that it would be difficult to have fences of rails or lumber, farmers would have discovered that fences were not necessary to any great extent.

Mr. Corey expressed his confident belief that a good hedge fence could be grown in from 8 to 10 years.

Mr. C. F. Field, principal of the Manchester union school, read the following paper on

EDUCATION.

The topic which has been assighed to me is one eminently appropriate to an occasion of this kind, whose every tendency and influence is educational in its results. Indeed institutes of this character may not inappropriately be called "Schools for the farmer." The interests and demands of education deserve to be thoroughly considered and discussed by the farmers of the whole nation. Nothing can be presented to your minds of more practical importance, or more vital to your true interests than the question: "How shall your children be educated and prepared for life's duties?" The broadness of the topic will prevent its complete discussion, comprehending as it does, the common school and the university; the home training and the preparation for business life; the religious training, and the industrial school, nor would it be desirable, at this time, even if possible, to enter upon so broad a discussion. Permit me, then, to limit this paper to a consideration of that part of the subject which will be of most service to them in life. And this will lead us, first to ask the question: Are mental qualifications as requisite to the farmer as to other avocations in life? This may be a fair question to consider at present, but the time is rapidly advancing when there will be no doubt of the importance of education to the farmer. The rapid strides now making in the science of agriculture, and which such meetings as this tend largely to promote, demand more and more the skill and the administrative ability of educated minds. Even now, if we look around us upon the farmers of our acquaintance, to ascertain which of them are really successful, we shall invariably find it to be the men who stand above their neighbors in education and culture. Is it not the educated farmer who makes the most improvements, who produces the largest and best crops, who wields the most influence and commands the most respect, who holds your public offices, performs your public business and leads in all public enterprises? And when I use the term "educated farmer," I would not be understood as referring particularly to the education acquired in the school-room, however desirable that may be. There are many successful farmers whose school-days were few, and whose knowledge of text-books small. But they are nevertheless educated in the true sense of the word.

Their education has been acquired by reading and by posting themselves on current events as given them through the press,—that greatest educator of the age; by attendance upon public meetings held for the purpose of promoting the farmers' interests; by social intercourse, and the interchanging of views and of methods with their fellow farmers, and by that sternest of all teachers,—experience. Many a farmer has made these means supply the place of a school education so thoroughly as to raise him to a high position of confidence and esteem in the community, and to enable him to acquire a considerable degree of wealth and worldly prosperity. But at what an expense of years of hard labor, of repeated failures, of struggling against difficulties arising frequently from a want of sufficient training in youth, has he finally acquired that disciplined mind which has lead him on to fortune! Go to such men and ask them their opinion of the importance of education, and you will not find them pointing to their own prosperity as an argument against the importance of mental training. They are generally the very men who are the strongest advocates of good schools, and who are found sending their children to the union school, or to the higher institutions at Ann Arbor, Ypsilanti or Lansing. Having felt the want of a better education themselves, they are the more desirous of securing for their children this great advantage.

But if education has been needed in the past, it will be found far more necessary in the near future. The time is coming when no farmer ignorant of the laws of nature, as revealed by modern science, can expect to succeed. The farmer of the future will have to know something of chemistry, of botany, of natural philosophy, and of kindred branches of science, of the laws of trade and commerce, and of political economy. If then, I have sufficiently established the importance to the farmer of education, let us consider the kind of education most needed. If I should ask whether a knowledge of Greek, Latin, French, and German, of Literature and Astronomy were essential to the farmer, I presume I should be answered by a very positive and somewhat disdainful "NO." It is not these things, however desirable they may be to the scholar, that you want, but it is a solid, practical knowledge of the fundamental branches. You want a school system which will prepare your sons for a practical farmer's life, giving them a well-balanced and practical mind, versed in all the rules and laws of ordinary business transactions, sufficiently informed to guard them against all swindlers and impostors, liberal enough to take up with all real improvements, and sufficiently acquainted with public affairs to perform aright their duties as American citizens.

If I mistake not, you desire to have your daughters so educated as to enable them to adorn your homes and your social institutions by their graces and charms, and at the same time preside over the domestic duties of your households in such a way as to make home the happiest place on earth to you. If then, I am not mistaken in regard to the kind of education you want for your children, it will perhaps be profitable to consider how this is to be acquired. And this is a part of the subject which demands your most careful attention, and which is far more worthy of your consideration than how to raise stock, or how to produce the largest crops of wheat and corn. Not that I would depreciate the importance of such topics, but what can, or at least ought, to be of deeper concern to you than the education of the rising generation, who will soon take your places on the farm, and upon whom depends the very life of the nation? For it is to the agricultural population that this country must need look for her chief support. Indeed, we can say without boasting, that the prosperity of the whole world depends largely on you farmers of America. You are not, like the peasantry of Europe, ground down under the yoke of oppression and povery, but you are the chief, the governing element in American society.

How, then, can you escape the responsibility of educating your children in a manner becoming their future stations? Let us, then, consider briefly the condition of our district schools, where the most of your children receive their only education. Are they doing what they ought, or what they might? Are they an object of pride to you to-day? Do you cheerfully pay your school taxes to support them? Do you go to great pains to secure good teachers for them? to build and equip comfortable and pleasant school-houses? Do you visit the schools, and do all in your power to encourage the teachers and children in their important work? I will leave these important questions for each person to answer for himself. It has been my lot to learn something of the wants of district schools, and I have been led to feel deeply the pressing need of reform in the district school system, or, more properly, the want of system. Indeed, time will not permit me to enter into a detailed account of the miserable inefficiency of the present method. It is a disgrace to the farming community, which, let us hope, is caused largely by inattention to the subject and not through any positive indifference to education, and I believe if the subject is fairly brought before their notice, it will be remedied. Let me, then, briefly call your attention to a few leading points which call for reform: First, The want of uniformity of text books. It needs no argument to prove the importance of classification and system in any kind of business, and especially is it true of school work. Second, Want of a graded course of study, that shall be uniform throughout the township at least. There is no reason why the district schools of each township should not possess a graded and uniform course of study that shall embrace the first eight years of the child's education, giving him a thorough knowledge of the common branches, including reading, writing, spelling, geography, grammar, practical arithmetic, U. S. history, and the elements of book-keeping, and doing the work as efficiently as the union schools of the villages and cities. Such a course would do away with the necessity of sending your children to town to school unless you desire them to take a high-school or collegiate course. Third, The number of months in which school is taught each year should be lengthened and the terms should correspond to those of the union schools. The present custom in many districts is to have four months school in the winter, and three in the summer, with such long intermissions between the terms that the children forget, during vacation, a large share of what they have learned the preceding term, as well as lose all interest and ambition for study. Fourth, The schools should be better supplied with necessary apparatus. You cannot expect the pupils will make much progress without maps and globes, any more than you can expect to carry on your farms without plows and drags, reapers and mowers. Fifth, Good teachers are especially needed. If you employ girls of 16, or boys of 18, to mould the minds and form the characters of your children, how can you expect satisfactory results? To hire the cheapest teachers is generally the poorest kind of economy. Sixth, The township superintendency does not accomplish for the schools what it ought. The compensation is not, and under the nature of the circumstances cannot be sufficient to enable the superintendent to devote much time or attention to the duties of his office. In many townships it is well-nigh impossible to secure a person for this important office, whose education, business, or inclination will permit him to accept it. We believe the territory under the jurisdiction of the superintendent ought to be extended so as to include, let us say, a representative district. This would make it possible to pay a suitable salary and secure competent persons for the office. We believe the authority of the superintendent should be somewhat enlarged so as to make all the schools of each district more directly under one general and uniform management.

These defects and these demands of the district schools, I have ventured to bring before you, very imperfectly I fear, but yet with a conscientious purpose to lead your minds, if possible, to dwell upon these important themes; and these suggestions I have offered with a conviction, based upon a careful study of the subject, of the pressing need of doing something immediately to remedy the evils of the school system. The union schools of this State are the pride of her citizens. The district schools, alas, are sadly deficient, although the prosperity of the State depends upon the work of the rural schools equally as much as upon the schools of the towns and cities.

Farmers of Michigan, shall this condition of affairs continue, or will you apply the remedy? The State legislature will probably enact the proper laws bearing upon the matter, provided you bring your influence to bear upon them. Shall our noble State have her district schools managed systematically, economically, and at the same time efficiently, or will you allow them to go on in their weakness and inefficiency? Shall they become the training-places of the educated farmers of the future? Will you have the facilities for educating your children brought to your own doors, or will you continue to send them abroad to be educated? Do you wish to make the farm attractive to your children so that they will not be impelled to leave home as soon as possible, in order to satisfy their natural longings for knowledge?

With you I leave the decision of these questions.

FORENOON SESSION.

Mr. Dorr read a paper on Horticulture, of which we have not the manuscript.

In the discussion that followed Mr. Dorr's paper Mr. Corey doubted whether it ever paid a farmer to keep a garden. It required a good deal of attention at a time when other work was crowding, and a few dollars would purchase for family use all that farmers usually get out of their garden.

Mr. F. A. Gulley thought every farmer should have a garden properly managed. He thought it would pay as well as anything on the farm. It was not best to attempt to raise everything, but to raise the usual variety of vegetables and small fruits in sufficient quantity to supply the family.

Mrs. Samuel Cushman read the following paper on

HOME INFLUENCE.

Home is of divine origin, and only reaches its true character and full significance when it conforms to the original appointment of the Creator; when it becomes the place of honor, of love, of authority, of obedience, and of a permanent, beneficent, formative influence. Like all institutions, home has its external form and internal power, has its memberships, father, mother, brothers and sisters. If each member be engaged in the interchange of the offices of love, in teaching and learning the lessons of religion, rules of life, and in forming habits of morality and industry; if it be the home of truth, refinement and simplicity of taste; if it be beneficial in its external form and as far as practicable surrounded with the beautiful in cultivated nature, as true as "none of us liveth to himself," such a home will be the best nursery of individual character and the surest foundation of social and national life.

Home, with its influences, is important because it is universal, and because the education it bestows, being woven with the woof of childhood, gives form and color to the whole texture of life. Here the child receives its first impressions, its germinal ideas, developing themselves into influences that help to establish a basis for those principles which actuate his future life.

Children are susceptible creatures, and circumstances, scenes and actions always impress them. As we influence them, not by arbitrary rules, not by stern example alone, but in the thousand other ways that speak through bright scenes, soft utterances and pretty pictures, so will they grow. Sports and griefs of a child seem to manhood as folly, yet amid these sports and sorrows he is cherishing the tempers which are to go with him through life. Objects which for the present agitate or delight him will pass away, but the habits of mind which they generate, the affections which they mature, are lasting. Some of our wisest and most illustrious men look back tenderly to their birthplace and love to acknowledge that in the industry and discipline of early years was laid the foundation of greatness. It is at home, if any where, that the affections receive their culture, that amiable dispositions are developed, and here all the faculties and qualities are matured which enter into the structure of worthy character. The simple lessons of home engraven upon the heart of childhood defy the rust of years and outlive the more mature, but less vivid pictures of after years. So deep, so lasting are the impressions of early life that we often see an aged man holding fresh in his recollections the events of his childhood, while all the wide space between that and the present hour seems a forgotten waste. Has not our great instructor said, "Train up a child in the way he should go, and when he is old he will not depart from it." If childhood be devoted to the reasonable expansion of the physical and intellectual powers, if knowledge of duty be acquired and rightly used, will not manhood be worthy? If human nature can be so influenced and trained as to know wherein its greatest good consists, it may be presumed that this good will be sought after and obtained. True home life is made up of little events, of little actions, but may they not each have directly or indirectly some relation to those who compose that home? An aggregate will at last be formed by long perseverance in line upon line and precept upon precept. Who is able to calculate the extent of the influence which one gentle, loving spirit has exercised in a household, shedding the mild radiance of its light over all the common events of daily life, and checking the inroads of discord and sin by the simple setting forth of "that love which seeketh not her own, but suffereth long and is kind." It has well been said that the moral influence of such examples is not alone confined to the recipient, but goes on from one to another, bearing fruit like good seed sown and reproducing itself till it is impossible in the lapse of time to calculate the good arising from it. Make home the expression of your best ideas of social life and use it as an instrument in moulding such outside life as may come in contact with it.

Home circles are the little wheels that assist in the revolution of the great whole. Like individuals they have their inflence on each other, and that influence will have its effect beyond the precincts of home, so long as its members depend upon it for shelter and retire to its scenes daily from the perplexities of the busy life around them. If here they meet intelligence and sympathy in what interest and concern them; if here they are incited to the commendable ambition which is necessary to the successful and merited acquirements of a true character, they will go out with courage in their hearts, which courage can be imparted to those with whom they come in contact; they in their turn exert each one his separate influence, and the great whole can be easily anticipated. It is by the strength of domestic affection that the frame-work of society is upheld and preserved.

Holland says it is through the medium of homes that the social life-blood of America is kept in circulation, and through this medium almost exclusively. Then how necessary that they should be controlled by those influences which are the natural offspring of a high and harmonious home life.

Neighborhoods and communities should mean something more than a certain number of houses, a certain number of inhabitants governed by the same laws and containing equal civil burdens. They should be informed with that social, genial life in which the influence of each nature, the power of each intellect, the force of every well directed will, and the inspiration of every high and pure character should be felt by all.

History teaches us that from the beginning of time, every nation has consisted of families; then is it not true that the hope of a nation rests on these homes, humble as they may be? Especially is this true of our Republic, where the intelligence and virtue of every citizen has a heightened relative value. Since its welfare is involved in its people, the character and habits of every member of its great family are important. Its safety may be interwoven with the destiny of those whose birth-place is in obscurity. In the homes of our country are the children, and from them go out into life men and women, and only as those homes are what they should be, will they be what they should be. Without virtue no commonwealth can exist. The nursery of this virtue is the family and if it does not take root and grow there it is in vain we look for it in riper years. Some of us may think, what share have we in the destiny of our country? How can we, in our homes, have influence there? Perhaps this illustration will convey the power of moral influence better than we can otherwise do it: Among the Alleghanies there is a small spring,—a rivulet stealing its unobtrusive way among the hills, until it spreads out into the beautiful Ohio. Thence it stretches away a thousand miles, having on its banks many villages and cities, many thousand cultivated farms and bearing on its bosom more than half a thousand steamboats. Thence joining the Mississippi, it stretches away some twelve hundred miles more, till it falls into the ocean, one of its great tributaries. So with influence, it is a rill, a rivulet, an ocean, boundless and fathomless as eternity. Perhaps we may have the same share the rill has in the river, the river in the sea? Should every little shaded streamlet tarry at its fountain head where would be the river that dispenses fertility, where the ocean, bearing commerce and wealth upon its never resting tide? If these homes all through our land were to embrace right views of their station, their responsibilities and their influences, and faithfully to act in carrying those views into practice, what earthly agency could do such widespread, such lasting good to the interests and to the institutions of the American people? What would wield so deep, so permanent, so universal an influence as they? for they lead into the very depths, the secret places, the hidden springs of human interests and human happiness.

Let us so respect the gifts of our bountiful Benefactor as not to divert them from their appointed use and benefit, but so improve them that our homes may be filled with good influences; that their society, their conversation, their amusements, their ornaments and books may be refined and pure; and all whose lives are associated with them, like living links, will connect them with the distant future, and through them as through electric wires fastened to their hearts, and these homes the living battery, they may send their influence, like a living stream, far into the future, and nations feel that in them is their safety and prosperity.

Mr. F. A. Gulley, foreman of the Horticultural Department of the Agricultural College, gave a lecture on "Economy in Farm Management." (See lectures given at more than one Institute.)

AFTERNOON SESSION.

Mrs. Van De Grift read a short paper on general housekeeping, giving her method of canning fruit, of performing several other household duties with a view to economizing time. She recommended to housekeepers generally a close observation of the methods of others as one of the best ways to enable us to improve our own.

D. W. Palmer, Esq., read the following paper on

"THE BEST BREEDS OF CATTLE FOR OUR CLIMATE."

The writer not long since found his name in a newspaper as selected to write an essay on this subject,—and all this honor and responsibility without his knowledge or consent. Who shall decide when *doctors disagree?* It sometimes happens that the essayist has an ax to grind. When we talk of the *best* breeds then it becomes simply a question of dollars and cents. Then that *kind* of cattle which will return to the owner the *greatest profit* at the *least expense* is the best. Farmers and dairymen raise cattle for beef, for milk, butter and cheese, and for work. *Beef* is the *final destiny* of *all* cattle. Milk is an indispensable article in every household, and butter and cheese are also largely consumed in the farmer's family and are largely an article of commerce. Oxen, when used for a farm team, are doubtless the most economical motive power a farmer can have. When the horse has become old he is of little or no value. Not so the aged ox, who, after having been a good servant to his owner during many years, is prepared for the shambles and brings his master a good price. I love to look at the sprightly Devon ox. His bright red color, his soft, silky hair, his long, slim, erect, curved horns, clean, agile limbs, bright, sparkling eyes, his sprightly movements, and his prompt obedience to the plow boy, gains the attachment of his driver.

Memory looks back over the *long years* when the writer was a barefooted boy, holding a wooden plow by one handle and following a pair of Devon oxen (before Jethro Wood patented a cast-iron plow.) Perhaps this is a digression, as I did not intend to write an eulogy on Devon cattle, as that will not grind an ax for any one here. Devon cows were passably good for milk and butter, but too small to be profitable for beef. They would thrive on short keep where other and larger cattle would scarcely obtain a living.

The Hereford cattle are very uniform in color and appearance, and the cows have the reputation of being fair for milk and butter, and the oxen are said to be good workers after being thoroughly broken, and that they attain large size. Mr. S. D. Martin, of Clarke county, Kentucky, says the Herefords are excellent workers and pull evenly, but they are harder to break in and are apt to be more vicious than the Short-horns. I prefer the Short-horns for oxen for the following reasons: they are gentle and docile, easily broken in and managed, strong and true in pulling, are not vicious among other stock, and when they have worked five or six years are easily fitted for the butcher, who will pay a good price for them. I think I hear some one say the above is a digression, as oxen are not in fashion. Well, I am an old man and remember that in 1836 there were more *oxen* than horses attended their owners to church in Clinton and Manchester on the Sabbath, and perhaps the worshipers were as sincere then as they are in this late day of fast horses, fine equipage, satins, superfine broadcloth, and velvet cushions. Please excuse, as I have forgotten myself again.

I find in the Report of the Michigan Board of Agriculture for the year 1878 an essay by Dr. James C. Wilson, manager of the Crapo farm, in which he claims they have on that farm Short-horns, Herefords, Devons, and natives, and he gives the Herefords the preference. He says they mature earlier, are more hardy and less liable to disease, are better feeders and grazers, fatten on less feed in their stalls, and keep in flesh at all seasons and when butchered produce more dressed beef to the hundred weight, and alive or dressed command a more ready sale than any other cattle *in the world*. That ax is ground. But it came to my weak comprehension to inquire, when such efforts have been made during many years by Corning and Sothom and others, that they have not been more generally introduced in the United States. The late Hon. Sanford Howard, former Secretary of the Board of Agriculture of Michigan, was sincerely of the same opinion of the above gentleman, and had conversation with the writer on the subject, and two of our friends not far off sent by him to Canada and two stock animals were purchased and brought over at the time the Crapo stock came. They were beautiful specimens in their class. Several years have passed since then, but I do not see any of those beautiful white faced cattle in the yards of those gentlemen, nor in their vicinity.

Jerseys and Alderneys, or Channel Island cattle, are, as their name indicates, natives of a group of islands belonging to England lying in the English Channel, and about 12 miles from the coast of France. The largest island is 12 miles long by five miles broad, and is called Jersey. Constant breeding and selections in regard to the *one* property of *milk alone*, has been crowned with remarkable success. All importation of other cattle to the island was forbidden. Some years past the Jerseys have been imported to England, and the peculiar richness of their milk so highly appreciated that many dairies keep a Jersey to every 10 or 12 cows to give character to the butter. The Jerseys are so totally unlike the other improved breeds that they are recognized at a glance, their peculiar color and deer-like heads being distinguishing marks. As ascertained by the lactometer the amount of cream varies from 19 to 25 per cent.

KERRY CATTLE.

The Hon. John Wentworth, of Chicago, a celebrated stock man, said:

Whilst I will say that they are exactly the breed of cattle for the mountain pastures of New England, I will also say that if I lived out on the open prairie, had no barn and could keep but one cow, I would prefer the little black Kerry to all others.

AYRSHIRES.

They are named from the county in Scotland where they originated and are chiefly bred. It is a high exposed region with bleak hill-sides and vast tracts of moorland,—climate mild and damp. In perfect keeping with this description of land is the hardy little Ayrshire, their breeders thoughtfully adapting the animal to the locality and climate where it is to exist.

GALLOWAYS.

The Galloways constitute one of the most important breeds in Scotland, and made its appearance within the last hundred years. This polled breed have gradually supplanted the horned cattle, being much preferred by the graziers and being docile and kindly feeders. The prevailing color is black, and the Galloway is essentially the grazier's beast. The Holderness and the Holsteins and some other breeds I shall omit, as I know of none in this vicinity.

THE IMPROVED SHORT-HORN.

There are two distinct classes of breeders of Short-horns. One class breed with the sole object of early maturity and a tendency to take on flesh and fat rapidly, and consequently make good show animals. The other class to have good cows for milk and butter. Of the former we always find an array at the fairs, while the latter are left quietly at home.

Mr. Fish, a dairyman of Herkimer county, N. Y., recently reported to the Agricultural Society that attention has been given to good selections for milk, and the yield had been from 600 to 800 lbs. cheese per cow. Found no difficulty in obtaining thorough bred Short-horns. A writer records that it is because the English breeders of modern Short-horns generally prefer beef-making to milk-giving properties that they have fostered variation in favor of the one at the expense of the other, until the milk-giving quality in some families is nearly bred out.

Mr. Frances Roach, of N. Y., reported that in one respect however, we must confess the old Short-horns completely bore away the palm from their descendants. We refer to their milking quality, once the distinguishing characteristic of the race. The breeders of the present day have voluntarily sacrificed this valuable quality for the sake of acquiring a greater propensity to fatten,—beef, beef, has been the cry.

We ourselves are of the opinion that it need not have been so utterly neglected as it has been, believing that in this breed, the two properties of feeding and milking *are marvelously united.* Such was the opinion of Mr. Bates, that eminent English breeder, who insisted strongly upon this view.

Mr. John Hare Powell of Philadelphia states that from the milk of the thoroughbred Short-horn cow Belina given in three days 8 lbs. and 13 oz. of butter was made, or at the rate of 20½ lbs. per week.

I found the following in a Jackson newspaper: Seven years ago last November I purchased a heifer calf, then a few days old, of D. W. Palmer of Washtenaw county, out of his celebrated head of Durhams. There has been sold from that calf's progeny five calves, from which he realized $280 (two of them being sold for beef), and has five head remaining valued at $500. Then I found published in another newspaper that this same man had kept an accurate account of this cow from the 16th of November, 1879, to the 15th of December following, with the following result:

Dr.

Value of grain fed during the month	$2 85
Hay for one month	2 62
Total expense	$5 47

Cr.

By 45 lbs. butter, sold at 20c	$9 00
By 60 qts. milk, sold at 5c	3 00
Gross receipts	$12 00
Profits per month	6 53

In the month of May, and on grass feed only, our cow Duchess gave per day for seven days in succession 54¾ lbs. of milk, from which was made 2½ lbs. butter per day during the same time. Her grand-dam was a prize cow for milk and butter in Madison county, N. Y., there having been made from her milk 17½ lbs. of butter per week, and her feed was grass only. The weight of Duchess (this cow) in ordinary condition was 1650 lbs.

Think it will be admitted that the milk of the above described cows would amply pay the total expense of keeping, then the value of the calf would be the profit on the capital stock invested. Is not this a fair mathematical proposition?

I have before me the record of the sale by auction of the calves of the herd of the late Edwin Smith: Belmont, $150; Fido, $130; Imperial, $205; Wardhart, $100; Young Guelph, $205. And he understood when living that the price obtained for the calves was the interest or the profit on the money invested. Why did some of the above sell for twice what others did?

Now I perceive the subject opens so wide a field of discussion that the'grindstone is well worn and *my gas* and *your* patience will soon be exhausted. I have not spoken of the commercial value of beef, butter and cheese, and the comparative weight of the several breeds, nor of the influence of climate, care, feed, etc. And as almost every commodity is sold by weight, that after a cow is so old that it is not profitable to keep her, then when fattened she will weigh 1,600 or 1,800 pounds; and the steer that at three years old will bring down the scales at 2,000 pounds. The comparative value of the best breeds for this climate is in my humble opinion very easy to demonstrate.

The principles of breeding, or the physiological laws involved in the reproduction and improvement of domestic animals, the law of similarity, and the law of variation, each contain matter for an essay which might be interesting to discuss if time would permit.

I close by using the language of Mr. F. P. Lee at the Dowagiac Institute in 1878: What kind of cattle shall we breed: If we desire a butter-maker alone, I answer the Jersey, because we are sure of a fair quantity of an extra quality of butter; if for milk and cheese, the Ayrshire or Holstein; if for working oxen, the Devon; if for beef, the Hereford. But if you want an animal combining *all* these qualities I answer the Short-horn, because there is no race of cattle that combines the qualities of labor, beef and milk in such a large degree as the Short-horns. This has been fully tested in this country and in England.

DISCUSSION.

Mr. English said he thought it was hardly correct to represent the Shorthorns as affording the best combination of all the desirable qualities. He thought that the Jerseys not only produced the best milk and butter, but that they also made good beef and as cheap per pound, if not cheaper, than any other.

This did not seem to be the prevailing opinion of the farmers present at the Institute. Messrs. Watkins, Cook and others earnestly defended the Shorthorns, claiming for them all that had been claimed by Mr. Palmer in his essay.

John T. Fraser, V. S., of New York, gave his lecture on the "Structure and Care of the Horse's Foot." (See lectures given at more than one Institute.)

EVENING SESSION.

R. G. Baird, Secretary of the State Board of Agriculture, gave an address on "Farmer's Boys in Relation to Farming." (See lectures given at more than one Institute.)

Mr. James Hood read a paper relating to farm matters generally and Merino sheep specially, which afforded scope for considerable discussion.

A paper was read also by Mr. Hitchcock, on the improvement and tillage of New Land.

After the adoption of resolutions of thanks to the Professors and others from abroad, for their valuable assistance; to the singers, for their excellent music, and to the citizens for their hospitality shown during the meeting, the Institute was declared adjourned.

◆

ROMEO INSTITUTE.

This institute was held in Grey's Opera House, and although the condition of the roads was exceedingly bad, the attendance throughout was quite large. The meeting was presided over by Hon. Geo. W. Phillips, and after the usual preliminary exercises, Irving D. Hanscom, president of the village of Romeo, was introduced, who gave the following opening address:

Just why a lawyer, who is in no sense a farmer, should be honored with any position at a Farmers' Institute, is more than I know; but this I do know, that I esteem it an honor, and experience a pleasure in meeting the intelligent farmers of the present day when assembled at their meetings, whether it be at their agricultural fairs with the samples of the products of their industry and culture, or at their Institutes, like the present, to discuss important questions of agriculture and stock raising, which shall inure to the benefit of themselves primarily, and then to the world at large. And when I say to the world at large, I have not in any sense taken too broad a scope of the influence of intelligent farming in this country.

By a reference to the statistics of exports from the United States, we find that in the year 1878, for example, the total exports were of the value of $723,000,000. And yet, of this great sum nearly $600,000,000 was for agricultural products alone, being 82 per cent of the entire value of exports for that year.

Thus we see how the industrious tillers of our soil are not only feeding 50,000,000 of our own people, but are adding $600,000,000 a year to our wealth, drawn from foreign countries, to say nothing of the millions which are added almost daily to the value of our lands, by improving, beautifying, and making comfortable the farmers' homes throughout our great country.

It is then, by considering the aggregate that we are only enabled, frequently, to fully realize and comprehend the magnitude of what we are accustomed to look at in detail. Even the intelligent voter who deposits his ballot at the polls, at an important political crisis, seldom stops to consider the importance of that act, except in itself, as a single vote cast, of small moment in the great aggregate. So the prudent and industrious farmer, when he is enabled to take his few hundred bushels of grain or other surplus products of his farm to market, seldom looks beyond the money realized, and its contemplated uses, although he returns home fully conscious of the value of every dollar thus honestly earned by the sweat of the brow. Yet, although forgotten by him, those products help to make up the grand aggregate of supplies for millions of people, and of wealth to our country.

Through the influence of agricultural societies, agricultural schools, and Farmers' Institutes, and do not let me omit, by any means, the agricultural periodicals, to be a farmer is no longer synonymous with mere drudgery, in which plenty of muscle is the only requisite, and plenty of brains a superfluity. The American farmer of to day is rapidly becoming as skilled and proficient in his occupation as the skilled artisan and professional man is in his business. He is diligently and intelligently solving the problem of how to get the largest number of bushels of grain, and consequently the most money, from the fewest acres; the most money from the same number of sheep, cattle, and horses; in short, how to make the farm pay the best with the least amount of physical labor. To discuss this and similar questions, I suppose, we are assembled here to-night, and that this Institute will prove both interesting and profitable, the well-known intelligent faces before me are a most sufficient guaranty.

And now, with these few informal remarks, and without keeping you longer from the enjoyment of the interesting and instructive addresses which await you, permit me, in behalf of the citizens of our beautiful village, to bid the farmers of Macomb county and their visiting friends a most cordial welcome.

Hon. J. Webster Childs gave the following address on

FARMERS' ORGANIZATIONS.

Without organization civilized society cannot exist, but anarchy and barbarism take its place. The great law of mutual dependence prevails throughout all nature, both animate and inanimate. Nothing exists simply for the sake of its own existence. And no created being lives that is not dependent upon his fellow beings, to some extent at least, to make his life other than a burden.

And in this relation of universal dependence, when applied to our race, we recognize the foundation for the doctrine of the brotherhood of man, than which no truth is more strongly set forth in the volume of inspiration, or found in more glowing lines on the no less divinely written pages of the great book of nature. And as the individual man, unaided by his fellow man, is powerless to promote his own welfare, a common desire, a common purpose, and a union of action, become a necessity in promoting the greatest good of intelligent existence. And in no way can such union of action be secured and such desires and purposes be carried out but by the aid of organization. Civilization progresses, and the well being of society is attained just in proportion as the organizations of such society are wise and well secured.

In all ages of the world the first and most important organization of society has been civil government, which has been a blessing just in proportion as in its fundamental principles and in its administration it has recognized and respected the natural God-given rights of all classes alike, and opened wide the door and made broad the field for human effort, either individual or collective, to struggle for the development and building up of the great interests of society. In promoting the social, the educational, the philanthropic and the religious, as well as the business enterprises of society, men have not been slow to recognize the fact that "in union is strength," and in all the past we find those of like purpose and interest taking the advantage, to a greater or less extent, of organized coöperation to carry out such purposes and promote such interests. Let us look back for a moment over the past century. How stupendous—almost beyond realization—have been the results of organized effort. Missionary societies have unfurled the banner of the cross on ten thousand hilltops, and through ten thousand heathen vales has echoed that angelic song that once waked the starry midnight on Bethlehem's plains—"Peace on earth and good will to men."

Bible societies have translated God's sacred word into hundreds of languages and are carrying it by millions of volumes to every quarter of the globe, and millions of minds once benighted are to-day searching that book divine for a more perfect knowledge of the true God and the glorious plan of salvation. Tract societies have scattered their gems of moral light and truth, innumerable almost as the leaves of the forest. From thousands of benevolent and philanthropic organizations have flowed streams of joy and plenty to innumerable homes of wretchedness and want, and caused the vail of sadness to be lifted from millions of hearts crushed and bleeding. The friends of science and learning in many parts of the world, and especially in our own glorious free country, are and have been doing much by organized effort to raise still higher the standard of education, and to bring within the reach of the humblest of American citizens the opportunities for intellectual culture. All the great moral reforms of the day by which vice is combated and virtue encouraged are being carried forward by the organized efforts of the friends of truth and good order. Through organized coöperation the sails of commerce whiten every sea, and the vast products of the earth are transported from land to land and the wants of the nations supplied. Within the past half century in our own country more than 70,000 miles of railroads have been built, opening thoroughfares for transportation in every direction through our vast territory, and spanning the continent from ocean to ocean. A hundred thousand miles of telegraph wire furnishes a track on which the lightning may bear our messages and do our errands. And in fact those engaged in every department of business, and in every profession, have long since recognized the advantages of coöperation, and by organization in various forms have developed and built up the interests with which they were more particularly connected.

But in looking over the history of the past one very remarkable fact is brought to our attention, that while all other classes and interests have thus been calling organization to their aid, one class, more numerous perhaps than all other classes combined, whose occupation as tillers of the soil lies at the foundation of the very existence of society, and in whose success the world is as *much* interested, to say the least, as in any other, has never to any extent attempted until very recently to develop and build up the great interests of agriculture and those connected therewith by organized, coöperative effort. Lying at the foundation of state and national wealth and greatness,—developing and producing to a very large extent the wealth of the world,—still those connected with agriculture have had little to do, *directly*, with shaping the political or controlling the business affairs of society. While the ignorant man could be a farmer, and in some cases a successful one, still in no occupation or profession was there a necessity for more thought, a clearer judgment, or a more thorough knowledge of nature's laws in order that the greatest success might be attained, and yet until very recently we have had few text books or schools particularly designed to fit the farmer for his occupation. And what was worse still, a public sentiment which has always prevailed where despotism reigned was fast gaining ground in our own land, that the tiller of the soil needed but little mental culture.

So general had this sentiment become that farmers themselves had come almost universally to adopt it, and until within a few years, nothing was more common than to hear farmers sneeringly speak of "book-farming" not only as of no value, but as a thing to be despised. And as the sons of the rural home began to look forth upon the active scenes of society, and to choose their life-work, mental culture, a liberal education, and if possible four years in classic halls, was thought important for such of them as designed to enter the professions, or engage in some of the more popular business pursuits; but if peradventure any one or more of those sons was to be "nothing but a farmer," if he could read, write and cipher a little, that was all that was thought necessary. Not only in our own State, but wherever in our country schools were established, the special design of which was to teach science as adapted to agriculture and the mechanic arts, some of the most bitter opposition that such schools had to encounter was from farmers themselves. From the standpoint of to-day it is easy to see what were the natural results of such a public sentiment, both upon farmers themselves and upon their occupation. As a class, although many among them were men of superior native ability and sound judgment, very few came forward as leaders in society, or occupied positions of honor or trust, and although by far the most numerous class in community, they had little to do directly in giving shape to the affairs of society. The rural homes which should be, and may be, beautiful and inviting even if humble, lacked to a great extent those evidences of culture which an intelligent and refined taste could easily have thrown around them, and they came to be considered, especially by the young, as places of drudgery and toil, and the life of the former as undesirable as compared with the opportunities of the village and city.

Until within a score of years there was comparatively little improvement made in farm machinery, and our system of agriculture had been to an alarming extent, a land-impoverishing system. It is not many years since New England agriculture furnished an abundant supply for her own consumption; some of her States raising quite a surplus. Well do we remember when New York, the great empire State, with her Genesee valley, was considered the granary of the country,—when the overflowing storehouses of Pennsylvania sought an outlet for her large surplus, and when the virgin lands of Ohio, whose richness was then considered inexhaustible, were looked upon as the far west. How is it now? New England feeds her population from her own soil only about two weeks of the year,—where once luxuriant crops of waving grain were seen, now almost barren sterility reigns,—pastures that once fattened well a score of bullocks for her markets, will not now furnish feed for more than ¼ of that number,—thousands of her large farm houses have been taken down, the barns either taken away or standing empty and in dilapidation, —and there are tens of thousands of acres of her hillsides and valleys from which rich harvests were once gathered, that the plow-share will never disturb again, but which are rapidly growing up to forests.

The broad fields of New York, especially her grain-growing sections, have lost their original fertility, yielding but comparatively small returns for their culture; so that from her own acres she is able to feed her own population but three months in the year. Pennsylvania furnishes not more than one-fourth the amount of food demanded by her own people, and in Ohio, as well as some others of the western States, the great question of the day is,—how shall we replenish, and return to their original fertility a comparatively exhausted soil?

Another disastrous result that naturally followed as the effect of such a public sentiment in regard to agriculture and its votaries, was that the attention of the more educated and intelligent was turned to other pursuits. The terms, "plain honest farmer," and "horny-handed son of toil," carried with them, especially to the mind of the young, the idea that labor was a disgrace, and as society in general was advancing in wealth and culture, the laboring classes were as rapidly as under our free institutions they could be, being fitted for, and assigned to a lower social plane, and the occupation of the farm, and the labor of the kitchen,—than which no department of human employment is more important to society, and none should be more honorable,—were shunned by our young men and women, not only as places of drudgery, but as less honorable than other occupations, and they were led to seek their life-work in, what appeared to them the more gentle, though over-crowded professions and pursuits.

Another attraction that the city and village had, especially for the young, was their superior social advantages. The rural home, from the very nature of the occupation, must be to a great extent isolated, and in the absence of any organization to bring farmers and their families together socially, there was comparatively little opportunity for that social intercourse and culture that adds so much to life's enjoyments. But a great change is taking place; much has already been accomplished, due to a very great extent to organization among farmers. First came our agricultural societies, with their annual fairs—organizations scarcely known a quarter of a century ago, or if existing then they had attained very little importance. Now we have our State, district, county, and in some cases township societies and fairs, where the *results* of the labors and experiments upon the farm and in mechanic arts, especially such as are immediately connected with agriculture, are brought together and compared; the wisest management of the most experienced, as seen in the best results, is made known to all and commended, and the cause of less favorable results does not pass unobserved. The superior merits or the defects of farm machinery are pointed out and carefully considered, resulting in still greater improvements. These fairs call out the largest collections of people, both at the State and at the county exhibitions, that are found together during the year. We have but to compare the exhibitions made at our State fair twenty or twenty-five years ago, with their very limited premium lists, and their comparatively meager show of stock and implements, as well as farm products, with the display of last year, with its more than 5,000 entries, its acres of farm machinery, with its more than a thousand head of splendid cattle and horses, representing all of the most improved breed, its over 300 sheep that would not suffer in comparison with that class of stock in any State or country, its more than 150 magnificent swine, its vast halls filled with a grand array of products from the farm, the dairy, the orchard, the garden, and the greenhouse; with the equally attractive display witnessed in the halls of machinery, manufacture and the fine arts. In a word, take that fair ground, with all its exhibits and appointments, and with its more than 50,000 people at once thronging through its vast halls and over its entire area, and the scene speaks in more glowing terms than words can of the rapid advance that is being made in agriculture. And what is true of our State is equally true of the most of our district and county fairs, according to the territory they represent.

Here and there have been organized and maintained farmers' clubs—would that they had been more numerous—an excellent instrumentality for the awakening of thought and a comparison of views and experience among our farmers, and wherever they have for a long time been actively maintained the results have been of very great advantage to the interests of agriculture.

The last and most important organization among farmers, is the Grange, which although it has had an active existence of less than ten years, has extended into every State and nearly every territory of our country,—and numbers its membership by hundreds of thousands,—an organization which in its declaration of principles and objects, as set forth by the National Grange, has for years challenged the criticism, and commanded the respect of all classes who have given them a moment's reflection,—its teachings are ennobling,—its object is to benefit the great producing class, socially, intellectually, and pecuniarily.

The well conducted Grange or Farmer's Club, brings to rural life that opportunity for social culture and enjoyment that has long been a felt need,—bringing farmers and their families together in fraternal relation, where the ties of a true friendship become strong and lasting. Where all are taught that honest and useful labor is honorable,—that no occupation is more noble or ennobling than agriculture when properly viewed, and in an intelligent manner prosecuted,—that no home can be made the abode of more true delight than can the home of the farmer,—that moral and intellectual worth, and not wealth alone, should be the passport not only to social position, but also to positions of honor and trust.

These opportunities for acquaintance and social enjoyment among farmers are not confined to the subordinate Grange, but are widely extended by means of the county, State, and National organizations, and the many "harvest festivals," and other similar gatherings, where farmers and their families come together in large numbers for social enjoyment and intellectual improvement.

Prominent among the important features of this organization, is the opportunity it affords to the farmer for intellectual culture. As it meets from week to week, it is to all who attend, a constant educator in parliamentary practice, and in the proper manner of conducting deliberative bodies,—an important department of education in which the farmers of our country *have*, in the past, been very deficient, but in which to-day there is no one class of our citizens better posted than are the members of this order.

Then also the whole range of questions immediately connected with the interests of agriculture are, from time to time freely discussed,—the causes of success and the reasons for failure in any and every department of agriculture are carefully considered and noted,—the comparative value and peculiarities of different breeds of stock,—what crops are best adapted to the soil of any given locality, and how best to grow them,—the particular merits or demerits of different farm implements,—in fact, every subject connected with the farm, the orchard, the dairy, or the household, are thoroughly canvassed,—views compared, facts given, and the results of experiments brought forward. Thus an ability to publicly communicate their views to others in an intelligent and instructive manner, is attained by those who had heretofore been entirely unaccustomed to do so,—thought is awakened and stimulated, and emulation in their calling excited. From the ripe experience and mature judgment of those who have for a long time made any given branch of farming a specialty, their associates gather a large amount of valuable practical information; and as agriculture opens the broadest fields for thought and investigation, when once the mind is awakened to the importance and dignity of the calling, intelligent labor becomes less a drudgery and more interesting. A desire for more knowledge is stimulated, the best writings upon agriculture are sought after, libraries principally of an agricultural character are being collected in many of our Granges, agricultural papers are better patronized and more carefully read, and Farmers' Institutes, a recent feature that indicates the intellectual awakening among farmers, are highly appreciated and numerously attended. A more intimate acquaintance is growing up between our scientific and our practical agriculturists, and our agricultural colleges are constantly growing in popular favor, and fast rising to take prominent positions among the most important and popular educational institutions of our land, and agriculture and its intelligent votaries are rapidly advancing to that position in popular estimation, that to it, and them, rightfully and justly belongs.

Never, probably, in the history of any country has there been in the same length of time so wonderful an advance in the labor-saving character and practical utility of farm machinery, so great improvement in the stock upon the farm, or in the general character of the agriculture of a people, as has been made in this country, especially in the great grain, meat and wool producing west, during the past ten or fifteen years.

A member of the British government, who was better acquainted with the past history of American agriculture than with its present character, stated some time since that "although America could now flood the world with her surplus productions, delivering both grain and meat in English markets and upon the continent cheaper than European agriculture could produce them, very much to the detriment of the farmers of those countries, still in his judgment this state of things could not last more than a generation or so longer, for American agriculture was a land-impoverishing system, and judging the future by the past, it would not be long before the vast grain-growing sections would become comparatively exhausted and would not produce more than would be required to feed her own rapidly increasing population." A French writer has also expressed the same opinion. Such a criticism would have been just, and such a prophecy likely to be fulfilled as things were a few years ago, but we trust—we *know*—that a change is taking place; we are becoming better farmers, keeping better stock, using more perfect machinery and more of it, more judiciously combining stock-raising and grain-growing, more carefully saving and more wisely applying fertilizers to the soil, and in numerous ways more intelligently recognizing the requirements of those great laws of nature, a compliance with which so surely underlies our greatest success as farmers. The fact that we are able to respond to the demand that comes from the empty granaries of Europe, and for their cargoes of gold to ship them our surplus wheat by hundreds of millions of bushels, is not a result alone of our largely increased cultivated acreage, but of the gratifying fact that we are, by a more intelligent and better system of agriculture *producing much more* to the acre. Such is the fact as shown by statistics throughout nearly the entire grain-growing sections of our country, and especially is it the case in our noble Michigan, where, even during the past six years of panic, while the financial coast has been thickly strewn with the wrecks of the shattered fortunes of merchants, manufacturers and others, agriculture has nearly doubled the productions of the State; we have learned lessons not only in agricultural science but in economy, and diminished the sum total of our indebtedness. The real wealth of our farmers has increased, and what is better still, we have, by increased intelligence, become better farmers, a fact shown by the better condition of our farms, the greater evidences of culture and refinement that is seen about our homes, our greatly improved stock, and our largely increased product per acre. These and many other results that might be enumerated are very largely due to the influence of farmers' organizations.

FORENOON SESSION.

The first paper of this session was by Mr. C. B. Kidder on

FARM DRAINAGE.

While presenting to you a few thoughts on the subject of farm drainage, you will please bear in mind that they are the views of a comparatively inexperienced farmer, who came here rather as a learner than as a teacher.

It seems to be the almost universal idea among farmers that the cost of drainage is so great and the profit so small that only those who have a great amount of capital can afford to drain their lands, and even those only when the land is remarkably wet, such as a swamp or sink hole; that when the farm is clear of all places where water would stand upon the surface of the ground through the greater part of the year their duty in that direction is fulfilled and nothing more is needful; but not so. The farm should certainly be clear of all such places, but there are principles of drainage beyond this that many farmers very little think of. Underdrains not only rid the land in times of freshet of excessive dampness by conducting it away, but in times of severe drouth they relieve its dryness by rendering the soil loose and porous, so that it is permeated by the air, which carries with it from distant bodies of water a great amount of moisture, which is readily seen by the great amount of dew deposited during a summer night. The porosity of the soil permits it to absorb and retain the moisture thus received from the air, as a sponge retains water from a dish, and as the parched rootlets extend their eager mouths in every direction their thirst is quenched and they revel in the moisture and send up fresh supplies to the branches above, invigorating the whole plant. Thus we see the double application of underdrains renders them a guard not only against excessive dampness, but also a great protection against excessive drouth.

I have in my mind an old and experienced farmer whose opinion is held in esteem by his neighbors, who will not cultivate his corn in times of great drouth, on the theory that the damp earth being turned up by the cultivator is exposed to the sun and so dried and deprived of what little moisture there is in the soil. I do not set lightly aside the experience of many years, but I do think this man greatly in error. The last summer was, as you all know, one of great dryness. I cultivated my corn as often as it was possible, and in the fall this man had occasion to come to my field, and he made the remark, "How nice your corn looks; why, you have a good crop here!" I said nothing, for he knows my views already. My corn was barely a half crop, but still I think much better than it would have been without cultivation. Deep cultivation on heavy clay soils may do a great deal in this direction and have in some instances the same effect, but there come many times when the deepest cultivation is not sufficient. If such soils were cultivated to the depth of 1½ or 2 feet (which I have never seen), and the soil left mellow over the entire surface to that depth, it would require an immense amount of rain to saturate it, but even then, when the snow went off in the spring, or at any time when they became saturated, the excess of moisture would have to be evaporated from the surface, which is a slow operation and would require several weeks and put the farmer so much behind time in his operations upon it. Even if the soil were cultivated to this depth there would be a gain of several weeks' time every spring by draining it, which gain is no small advantage to the tiller. Furthermore, the owner of such land while waiting for his ground to become dry becomes anxious to see his crops growing, and many times before it is dry enough he begins work upon it, and puts the seed for various crops into cold, clammy clay where it will not readily germinate and some of it will die and decay, while the remainder will put forth very feeble yellowish green shoots. If, again, later in the season we glance over his field, we shall see a thin spindling crop, anything but profitable and satisfactory to the farmer, anything but encouraging to future exertions. On well drained fields work can be commence early in the season, the seed can be sown in warm mellow soil, germination immediately takes place and is followed by a strong, vigorous growth, which almost always insures a bountiful harvest.

By walking over the ground in the spring through which drains have been cut, I have been surprised by the difference in the feeling and appearance of the soil. When approaching a drain if the ground be plowed, you can notice instead of the hard solid feeling to your foot as you step upon it, that it begins to feel more loose and mellow, and that when the lumps have been left sticking up in plowing they assume a grayer or lighter appearance than the harder heavier ones near by. Later in the season when the hot drying rays of the summer sun have beaten upon it for a time near the drain, it will have the same mellow feeling as in the spring, while the undrained parts will feel harsh and crusty and full of hard lumps.

I have two pieces of land joining each other with only a fence between them, one of which has been cropped for a number of years; the other on account of dampness has never been cropped till lately. A few years ago I cut several drains through the damp piece containing three acres, and immediately commenced cropping it. It has since yielded very large crops of corn and oats. One year oats were sown upon both pieces and the result was, on the damp piece over 60 bushels per acre while on the dry one about 30 was all I got. Here we see a piece of land that as it naturally was yielded only grass and that not so well as now, brought to grow various kinds of crops at more than double the rate of the dry piece. There is also another advantage, that a change of crop can now be given to both pieces which could not be done before. An incident might be mentioned here concerning one of the drains. In its course it passed a willow tree at a distance of about 15 feet from its base, and the fine roots from the tree completely filled the three-inch tile in two years so that it was necessary to take up the tile and clear it for a distance of over 3 rods. These roots were very fine, thread-like fibers, and in number simply countless. They came into the tile at every joint and ran with the current until the tile was full. Since this experience I allow no willow tree to grow near a drain.

In draining a farm there should be some system in view so that every tile may drain as great a surface as possible. The cost of drainage is an item worth considering, and drains should be carefully planned so as to reach the desired end with the least outlay of labor and expense. I know a farm of 80 acres upon which there is considerably over three miles of drain, and still a large part of it is without drains. There are places where the drains converge to a point something in the form of the spokes of a wagon wheel; other places where for some distance they approach each other and then run so near together for a distance that one drain might do the work of two. This is a waste of labor and expense. If the owner had had in view some system at the commencement and as fast as was practicable followed out that system, it seems to me the same amount of drains might have done much more good. The system need not necessarily be completed at once, but may be advanced toward completion with each additional drain as circumstances allow. The different conditions under which drains must be built, and the difference in the lay of the land as we say, will make it impossible to map out a series of drains that would suit every farm. The owner must use his judgment and build where he thinks best; but as a general rule I may say that one large drain should be cut running across the foot of the incline to be drained, and large enough to carry the water from the entire system, then at various intervals branches may be constructed. The drains should as far as possible be without angles, and as nearly parallel to each other as practicable throughout their entire length; the branches should not be joined at right angles to the main line but should join it obliquely. The branches should run directly down the slope to be drained. A very little fall is enough to form a swift current in a drain cut in a straight line.

The fall of some of the great rivers of the world is surprisingly small. The Amazon river of South America has only 12 feet fall in the last 700 miles of its course,—less than one foot fall in fifty miles,—yet it has a current strong enough to carry an amount of sediment into the sea that colors its waters for a distance of 300 miles from its mouth. The entire fall of the Mississippi river, with its length of 4,100 miles, is only 1,500 feet, and part of this is lost in cataracts and rapids. Warren says a declivity of three inches per mile is enough to give a velocity to running water of three miles per hour, and three feet per mile in a straight, smooth channel makes a mountain torrent. The entire fall of the Volga river, with a length of 2,800 miles, is only 633 feet, which gives only about an average of 7½ inches per mile for the entire length. The reason of the slow current of some of our great rivers is their crookedness. They continually come in contact with their banks, retarding their velocity. Their shallowness also in many places causes much friction upon the bottom and slackens their currents. The velocity of a stream is dependent upon the form of its channel, the slope of its bed, and the volume of water. We notice that the velocity of a stream is always greatest when it is narrow and deep, also that it is greater in the middle of the stream than upon either side. This should teach us the form of tile to use in drains, because the greater the velocity the less likely is a drain to become stopped. The tile should not be flat nor broad, but narrow and deep. The shape of the channel should be that of an egg with the narrow end down, so that when the drain is not full the stream will occupy a small narrow channel, and therefore by concentrating its force carry along what sediment there may be in the water to the mouth of the drain, which should always be watched and kept clear so that the delivery may not be retarded.

The depth of drains is a matter for discussion. I think that depends somewhat upon the nature of the soil, but should never be less than two feet. If the soil is of a loose nature then the drain should be deeper than in a firm soil. I cut my drains three feet deep. When the earth is not firm in the bottom of the drain I usually lay the tile upon strips of board. Some people say that it is just as well and much cheaper to be careful not to disturb the bottom and lay the tile directly upon it and cover it immediately. All soils are not benefited by draining. Mistakes are sometimes made and money uselessly expended upon drains dug in land that might be said to be already naturally drained. Open, porous, sandy soils, with gravelly or sandy subsoil may be placed in this class; also gravel and sandy loams resting upon a hardpan subsoil, if the hardpan is near enough to the surface to be reached and broken up with the subsoil plow. Soils that are very compact, or shallow soils, resting upon clay or a thick hardpan subsoil need to be drained. The effect of the excess of water in this soil is to render it hard and unproductive. Hard, wet soils may be full of the elements of plant food and still be almost barren. If the tiny rootlets cannot penetrate the soil and gather together a sufficient store of nutriment to nourish the plant the plant must die. The excess of water excludes the air and keeps the soil cold, and the more vegetable substance there is in such soil the more compact will it be, and it becomes sour, heavy, cold and unprofitable to work. The application of fertilizers to such soils will not render them productive any more than draining a sand bed would make it fertile. The only remedy is to remove the surplus water and the change in the fertility will at once be perceptible. In such cases any man can afford to drain, and the poorer he is the better can he afford it, for he cannot afford to work a cold, sour, wet peat bed and receive no returns when by the expense of a few drains his income might be doubled every year. Drainage is indispensable to successful agriculture *where* the water of stiff clay lands or swamps is retained by impervious subsoils or other causes. Very many soils are benefited by draining, and some *must* be drained in order to be of any profit. Alluvial soils as a rule are among our most fertile soils, and also are among our wettest soils. They consist of finely divided matter thoroughly commingled. They are found at the mouths of rivers, along their valleys and in our swamps, and are frequently called bottom lands. In these soils drains may be cut very deep, as they are often quite porous and sometimes very deep. They also by working settle and become firmer, so that a few years after a drain is cut if it be dug up it will be apparently not as deep as originally dug.

I have seen advertised very strong and costly ditching machines which do the work of many men with great ease and accuracy. I have also read of various curiously shaped implements to be used by hand for digging ditch and laying tile, etc. The machines do very well for those who can afford them, the hand implements act as good money-getters to the manufacturer; but it seems to me the best ditching apparatus for the common farmer is a good, strong, round-pointed, long-handled shovel, and a good sharp spade in the hands of a strong active man, fortified three times a day with pork and beans. The bottom of a drain should be as uniformly graded as possible, for if there are some places where the current is very slow, the sediment that may be in the water is likely to stop and form a stoppage in the drain. A good way to get an even grade in the bottom is to set two stakes in the drain not far from each other, and stretch a strong cord from one to the other directly over the middle of the drain. By the use of a level determine the proper fall for the drain to have and give the cord the same fall and draw it tight. Get a stick that will reach from the cord to the bottom of the ditch, and by measuring it at different points the drain may be made with a fall exactly uniform, and exactly the same as the fall shown by the cord. For example, if the cord is four rods long and the drain is to have a fall of one inch per rod, one end of the cord should be four inches higher than the other end. In laying tile be particular to make close joints, not leaving any places for the water to get in, that will take care of itself. Begin at the lower end of the drain to dig, but at the upper end to lay the tile so that no dirt can wash into it as the work proceeds.

The health of the family is also an item worth considering in this connection. Many a man has paid out more for the services of a physician to cure diseases caused directly or indirectly by his neglect to construct sufficient *cellar* or *sink* drains than many times the cost of such drains. No family can enjoy the highest degree of health for a long series of years if they must continually inhale the odors of the unsightly slops that are constantly collecting and being thrown out from the kitchen. If these (as is too often the case) are thrown upon the ground near the door, there is constantly emanating therefrom the germs of disease which are often inhaled by the occupants of the house, and often (if they do not actually shorten) cripple their lives and render them unable to enjoy the good things which they have. The cellar may be the receptacle into which is drained the surplus water in its vicinity, where it will remain a long time and continually send up vapors loaded with deadly poison, to be introduced through the lungs to the blood, and may inaugurate a long train of diseases sometimes ending in death. This may be obviated and should be by supplying an outlet. The well should also receive some attention. This may be so located as to receive the dregs of the barnyard or the soakings from the kitchen slops; and indeed many times when we suppose we are drinking pure water, could we be enabled to see what the microscope could reveal, should we be shocked with its impurities and filth. It can need no argument to convince any thinking man that to imbibe poison as often as we drink (be the quantity ever so small) will, in time, have a most dangerous influence upon the health. It seems to me were the practice continued through a long series of years the strongest constitution must succumb to its influence. I have no doubt that many of the fevers of which we hear are directly caused by either inhaling or drinking such impurities, which with proper care might easily be avoided. The location of the house should be selected with the most scrupulous care, for in the house we spend by far the larger part of our lives. Every night when we lay ourselves down to repose, and nature strives to undo the evils we have wrought upon our bodies through the day, we can put ourselves under the influence of pure air or impure vapors, as we please. Every night when nature strives to build up and strengthen us for the coming day we can supply her with the pure air of heaven filled with life-giving power, or we can load her down with accumulated filth from which she *must* select her material for present use. If I think aright, man was not intended to spend his life in misery. What a pitiful sight it is to see a human being chained to disease with which he must drag out a miserable existence! Man was not so intended. He was made for a purpose, and what a gratifying sight it is to see one who has fulfilled that purpose and is ready, as testify his whitened locks, to put this world behind him, yet in the full possession of his mental and a goodly proportion of his physical powers! Such is the result of health, which not every one can have, but by looking well to our surroundings we can materially increase the chances for it. Again I say don't neglect the sink or cellar drains.

When John Johnson of New York, that old pioneer of underdraining, commenced to drain his lands his neighbors laughed at him for burying his crockery under ground where he never would see it again; but that crockery has many times been resurrected since then in his multiplied bushels of grain and has helped materially to gain for him a lasting and a coveted position among the grandest farmers of the age. How his bosom must have swelled with commendable pride as he gazed upon his crops, which far outstripped those of his neighbors, and thought of his grand victory over those waste lands of nature. Not only are grains of all kinds benefited by drainage, but fruits, and flowers, and grasses, and trees, and shrubs, and herbs of all descriptions flourish many fold better with warm, dry feet in the spring, and warm, moist ones during the severe drouth of nearly every summer of our lives. A revolution in our cultivation must be wrought if we would keep pace with other trades and sciences. Never has farming made such rapid strides in improvement as during the past few years, and I verily believe that in the near future we are to see wonderful improvements. The idea that any fool can become a farmer who has not wit enough to live at any other business is fast losing ground, and we, if we would succeed, must cultivate our lands more thoroughly. It is said between the years 1856 and 1863 that the United States and Russia exchanged places in regard to the amount of wheat exported to England. In 1856 Russia supplied England with 44-100 of the total import; but in 1863 the United States supplied 44-100 and Russia only 21-100, and among the direct reasons of this change is that in the United States more skill is used in producing it. The effect of this is very disastrous to Russia, and one after another of her once flourishing business houses is falling in ruins. Of late the traffic in meat between the United States and Europe has assumed new features and the income to the people of this nation therefrom is most gratifying. Let us as we rejoice at our success beware lest we too fall. If we would retain our high position in respect to other nations in supplying the world with provisions we must plow deeper, we must fertilize more plentifully, we must cultivate more thoroughly, and we must drain our farms; then, with the blessings of our Father in heaven, who sends the sun and the rain with reasonable prospects, may we look for bountiful harvests, happy hearts, and larger profits.

DISCUSSION.

Mr. Day said he had a flat field sixty rods long with an open ditch with about a foot fall and at the lower end the water would always stand above the tile. He asked if such a field could be effectually drained?

Mr. Leonard said that his experience was that tile could be laid nearly level, or with a slight descent, but that in such cases the outlet must be free.

John Paton, of Armada, had used lumber to make drains, and asked if it would not answer fully as well as drain tile?

C. B. Kidder replied that he knew of no material as cheap, durable and effective for drainage as tile. He paid thirty-two cents a rod for the tile. To make a drain with lumber in the way proposed by Mr. Patton would require from twenty-four to forty-eight feet per rod. Farmers could estimate for themselves the relative cost. Tile would last forever if well burned; they were porous, and could easily be taken out to permit of cleaning if it were found necessary. The whole ditch need not be redug, but here and there an opening made would answer every purpose of cleaning.

R. G. Baird, in answer to Mr. Day, said the experience of William L. Webber and others in the Saginaw Valley was that the slightest possible fall was sufficient. He thought beyond all question that tile were the cheapest and best material for drains.

Mr. Gulley, of Dearborn, advocated the round or cylindrical tyle. In answer to questions he said that it would pay to drain any land that held water within less than four feet of the surface. It might not be so desirable to drain gravelly soil, but it was beneficial to do so. A drain laid level would work effectively, even if there was not a running outlet. The pressure or head of water above the outlet was sufficient to clear the drain and force the water through. Tile drains should be laid about four feet below the surface. It was not necessary to go below four feet, and anything less than that was not so good as the greater depth. Small tile were relatively better than large ones, because with an equal flow they cleaned themselves better of silt. It was desirable to have silt basins at proper intervals to facilitate cleaning. The flow could be made useful in ditching; first the ordinary flow, and next the subsoil flow. The drain should run directly up and down side hills. Oblique drains would not answer. He thought Mr. Day's field could readily be drained, and would be immensely improved by it, if the water at the outlet disappeared at any time during the year.

J. Webster Childs said three inches to the mile was fall sufficient, if the tile were accurately laid. He preferred tile beyond all other materials, but had used oak lumber, sawed five inches wide, inch and a half thick, leaving, when put together, a channel two inches wide and five inches thick. He did not know how long it would last, but it would at any rate last long enough to pay where tile could not be procured. It was not to be regarded as equal or comparable to tile, but was a tolerable substitute for them. He agreed with Prof. Gulley that four feet was the best depth for a drain, but had found good effect from drains but two feet deep, or even one foot and a half, where the land would not admit of making them deeper.

President Abbot vouched for Mr. Gulley's great experience and success in draining, both on his own farm and at the Agricultural College farm.

In answer to questions Mr. Gulley said hard burned tile, laid but a short distance below the surface in "cat-holes," and carrying a stream of running water, would not be injured by frost. In such cases the water would not freeze. To prevent the roots of trees from getting into and obstructing drains in orchards collars should be put over the joints.

Hon. Chas. Andrews of Armada read a short but excellent paper on

SHEEP,

in which he claimed that they were among the most profitable stock a farmer could keep. Besides the direct cash return from wool and increase, much advantage was derived from them in keeping down brush and weeds, which they did in feeding. There never was a time when fine wooled sheep were more in demand than now. The careful breeder can find a ready market at remunerative prices. He believed it was more profitable to keep comparatively small flocks, and had a decided preference for the fine-wooled variety.

DISCUSSION.

R. F. Johnstone thought all breeds of sheep were profitable to Michigan. The farmers of this State, by habit, were partial to fine-wooled sheep. The time might come when long-wooled and good mutton sheep would be more desirable here than at present. Long-wooled sheep could not be profitably raised in this climate without the use of the turnip. Therefore, to introduce different breeds into general use in Michigan would require a change in culture, or rather in crops. The fed sheep in Michigan brought rather a better price in New York than any other.

L. Parmalee, of Armada, believed the grade sheep were the most profitable for the farmers of this section.

Mr. Flagler, of Richmond, in view of the prices now current, sheep against sheep, believed the fine-wooled sheep the most profitable.

Mr. Reed, of Bruce, thought any breed of sheep could be made profitable, but gave his preference to the fine-wooled breeds.

Mr. Bentley believed that the ordinary breeds of sheep—those without a "record in the herd books"—were as profitable as any.

Geo. W. Phillips, President of the Michigan State Agricultural Society, said his experience prepossessed him in favor of fine-wooled sheep. Their wool was most in favor with manufacturers.

Mr. Norton, of Oakland county, also expressed a strong preference for fine-wooled sheep as the most profitable.

R. G. Baird believed something of a change was now taking place in regard to choice of varieties. In the large ranches of the west wool could be produced cheaper in proportion than here, but such was not the case with mutton. The coarser grade sheep could not be so successfully raised in large flocks. There was a growing demand for the mutton sheep, and the demand would be supplied.

AFTERNOON SESSION.

R. Jennings, V. S., of Detroit, gave an excellent lecture on the diseases of the horses' feet and limbs, with many valuable suggestions in regard to treatment. The lecture was full and minute, and illustrated by many specimens of sound and diseased hock and other joints. Dr. Jennings declared against the use of clips on shoes, and showed by hoofs and bones that in the course of time they distorted the growth of the hoof and produced a decay of the interior bone of the hoof which extended from the toe upwards. He exhibited specimens which revealed a groove deep enough to contain half the finger. He found that horse-shoers, as a class, had set notions of their business. They considered that they had learned their trade and resented anything that looked like advice. Few of them had correct ideas of the structure and anatomy of the horse's hoof, and most of them persistently worked against nature in their shoeing operations. He had proposed to the horse-shoers of Detroit to form an association for mutual improvement, and volunteered, if they would do so, that he would lecture to them weekly for a year, without charge, upon matters connected with horse flesh. But the association was not formed. He had read in the Free Press, in a report of the farmers' Institute at Rockford, that Dr. Fraser advocated a flat, level shoe, without calks. He quite agreed with him in the principle and had urged it for the last thirty years, having fully expressed himself in a work on the subject published many years ago. Dr. Jenning insisted that the bearing of the shoe should be perfectly level; that a straight edge laid upon the inside should touch flatly all through. The natural shape of the horse's hoof and the way in which it rests upon the ground is a sufficient guide. He also condemned the useless trimming of the hoof and deprecated the cutting of the frog, an operation which was extremely injurious. A healthy hoof could not be foundered, no matter how the animal was treated. A healthy hoof was not necessarily shapely, but it was elastic and sound, not hard and rigid.

Robert McKay, Esq., of Bruce, gave an address on

FARMING AS COMPARED WITH OTHER OCCUPATIONS.

In this paper a comparison was made between farming and other industries, greatly to the advantage of the former. Mr. McKay lauded the pursuit of farming and gave high praise to farmers as the conservative element in the country. The honor and welfare of the nation to a large degree rested upon the farmers. Mr. McKay expressed himself very decidedly in favor of farms of not less than 160 acres of land. Occupations might change, indeed did change, and some trades of a hundred years ago had entirely disappeared, but the tilling of the soil would continue until the end.

DISCUSSION.

R. G. Baird could not agree with the necessity for such large farms, however desirable they might be. Nor did he think it best for all the "boys to settle around home." In fact he thought it better for all concerned that they should "scatter." It was better for their growth and prosperity, better for the old folks, too, always supposing the children to be the right kind of "boys;" that is, sound, sober, energetic, honest and intelligent.

J. Webster Childs opposed the 160 acre idea. It would do well for the "boy" to begin as best he might upon forty acres if he could get so much, but if not upon less. At the same time, as a business interest, it must be admitted that 160 acres were necessary to good success, and the larger the farm, with intelligent culture, the greater would be the returns. He did not think that farmers would become millionaires; it was not desirable, perhaps. But there was no class of people who stood upon the independent ground of the farmer; no class who had fewer perplexities and conflicts with other business men.

Mr. Adams, of Rochester, thought that professional men—the doctors and the ministers—were usually the narrow men. They were confined to "pathies" and "ologies," tied up thereby and mentally distorted and ruined. [Laughter.] The farmer was not cabined or confined by any such restricted views, but was able to see good in everything. In regard to the size of farms much depended upon the farm. His, for instance, was of 116 acres, and one acre of it was as productive as four acres of an ordinary farm. Indeed, one of his neighbors who had gone to Kansas and returned said, "Your farm is worth a whole county in that country."

Mr. Norton, of Oakland County, gave it as his opinion that while it might be true of the past that a liberal education tended to divert from the farm, it was now apparent that farmers were beginning to seek a higher education for the sake of the benefits which it gave them as farmers. He believed that, however it might seem at the commencement of a man's career, as one passed the decline of life and tended down hill to the end, there was no occupation which gave better returns, or permitted of more enjoyments and comforts with less exertion and fretfulness, than farming.

EVENING SESSION.

The second evening session was occupied by Secretary R. G. Baird and President T. C. Abbot. The former gave his lecture on "Farmer's Boys in Relation to Farming," the latter his lecture on "Manual Labor in our Colleges." For both of these lectures see Lectures and Addresses given at more than one Institute.

At the close of Pres. Abbot's address resolutions of thanks to the State Board of Agriculture, the representatives of the Agricultural College and others who had aided in making the Institute a success were adopted, and the Institute declared adjourned.

◆

BUCHANAN INSTITUTE

was held January 27th and 28th, and was presided over by Mr. Thomas Mars, of Berrien Center. Wm. D. Davis, of Niles, and J. F. Higby, of Benton Harbor, were chosen Vice Presidents. J. H. Gillette, of Bertrand, was chosen Secretary. Music was furnished by the Roe family quartette. President Mars made the following

OPENING ADDRESS.

In behalf of the friends of Bucanan and farmers of Berrien county I bid you welcome. Farmers and friends, we are pleased to see so many turn out to assist us in this, our first Institute in this county. May it prove a lasting benefit to farmers and a source of pleasure and profit to all in attendance.

The object of these Institutes is to disseminate knowledge in science and practice, through lectures and discussions, on subjects relating to farming.

The committee to whom was referred the matter of arranging a programme for this occasion have done the best they could within the limited time allotted them. They have endeavored to select from the most practical farmers at their command. Some of the best speakers and farmers being sick, or absent from home, it was with a great deal of persuasion that we secured the services of some placed on duty. I hope and believe that their efforts will be satisfactory to themselves, and a great benefit to us all.

Fellow-citizens, you must not expect to hear from the farmers any great oratory or flowery essays, but a plain statement of facts as they have learned it from long and difficult experiment. If we had wanted oratory we would have selected, as speakers, some of the professional men of other callings; not that we are opposed to oratory, but have not that element in our ranks. You are well aware that in times past there has not been a proper concert of action with the farmers of our country. But I think we see in the near future a better day dawning.

We look for the time to come, when from the farms and shops men will go forth able to fill our executive and legislative halls with honor and ability; when intelligence will become so broad and general that it will be impossible for our judiciary to be corrupt, and when we shall cease to hear of venal legislators and corrupt public servants.

Now farmers, in order to accomplish this result, we must be educated, for education is the corner-stone of all professions. We must work for and sustain our Agricultural College and our experimental farm at Lansing. We must secure men to represent us that will give that institution equal aid with others in the State. We want to send men there who will dare to say that they will make that College large enough to accommodate our daughters as well as our sons; men who will say that the farm shall be experimental if it don't bring a dollar of revenue. With the aid of these wise men from the College, and this Institute, we can gain knowledge that would take years to gain through our own experience. I believe that agriculture is the noblest calling of man, and in order to sustain it as such, we must be educated in the broadest sense.

I trust the exercises will be pleasant and profitable to all in attendance.

In conclusion, I hope that in discussion you will be courteous but vigilant; see that all subjects that may come before us have their proper ventilation. After the reading of papers or delivery of speeches, time will be given for a fair and free discussion of each subject. All are invited to participate in the discussions, and are urgently requested to do so.

Wm. A. Brown read the following paper on

SMALL FRUIT CULTURE FOR MARKET.

Having been requested by your committee to prepare a paper to be read at your January meeting in Buchanan, the subject being "Small Fruit Culture for Market," I will endeavor to give a short history of this important industry in Berrien county—varieties, modes of culture, marketing, etc.

The climatic advantages of the Michigan lake shore region began to be appreciated about the year 1857, and in the season of 1860 several large peach orchards were in bearing in the vicinity of St. Joseph. During the season of 1861 T. W. Dunham, D. N. Brown, and several other pioneer fruit growers planted small quantities of Wilson's Albany strawberries for market purposes, this variety being favorably known at that time. The prices obtained in the Chicago market, during the first two or three years, proved remunerative, and, as Michigan strawberries began to be better appreciated in the Chicago market, both for city consumption and for reshipment to many points throughout the northwest, the area planted to strawberries in Berrien county was rapidly extended, and, excepting an occasional glut in the middle of the season, the demand kept pace with the supply until the seasons of 1874–5, when, in consequence of the "hard times," the laboring classes were unable to purchase so necessary and so cheap a luxury as the strawberry.

In consequence of the loss of peach trees by the yellows, a very large acreage has been planted in small fruits during the past few years; and as prices have often proved unremunerative, many thousands of bushels have gone to waste. Thorough cultivators, however, who grow the best strawberries, and who send no poor fruit to market, seldom fail to obtain paying prices, but fields which have been cultivated one or two seasons, and then left to run wild whilst several crops have been gathered from the matted ground, are being plowed under and more thorough methods of cultivation are being adopted.

The yield shows a wide range. Old fields on poor soil, with little or no cultivation, seldom yield more than 20 to 30 bushels per acre, while good cultivation of young plants in matted rows, on the best soils, has given 300 bushels to the acre of fine fruit. The number of acres is less than formerly, but the production of poor strawberries is in excess of the demands of the market. Many localities in Michigan and in other States have been partially supplied with strawberries from Berrien county; but as more of this fruit than is required for home supply is being grown in the vicinity of large towns throughout the northwest, our market is being limited to Chicago. No locality which matures the strawberry with us can ever compete with Berrien county in growing strawberries for the Chicago market. The adaptability of our soil, our climatic advantages, and the cheap and speedy transportation facilities afforded by competitive lines of steamers, and fruit train, by which we are able to place our berries—sparkling with the evening dews of Michigan—on the market, and upon the tables of consumers in Chicago in the early morning, will always confer preëminence upon this locality for the growing of small fruits for that market.

Several towns in southern Illinois are extensively engaged in growing strawberries for northern markets. As these markets are of great extent, and as the southern season is from two to three weeks earlier than ours, southern Illinois has the advantage of us in being able to supply the first cravings for this delicious fruit. We are reciprocating the favor, however, by shipping largely to southern points. Large quantities of strawberries grown in Berrien county find a market in St. Louis, and, during the last season, berries grown in Muskegon were successfully shipped to New Orleans.

Varieties.

Practical fruit growers in Berrien county have not made costly experiments with new varieties of small fruits. New varieties of strawberries have been discussed and tested by amateurs and others, and when any variety has proved worthy of cultivation for market purposes it has been utilized. Wilson's Albany occupies nine-tenths of the ground planted in strawberries in Berrien county; and, until a berry is discovered which shall embody the bearing and carrying characteristics of the Wilson, and which shall be better in quality, the Wilson will continue to be *the* market berry of the West. The Triomphe de Gand is a large, firm, glossy berry, and is generally conceded to be the best strawberry grown, but it requires the best soil, and careful cultivation. Under equal circumstances it will produce about one-third as many berries per acre as the Wilson. The Jucunda succeeds well on moist rich soil, is a very large, fine looking berry, but is less firm in its texture and not as good in quality as the Triomphe. Monarch of the West is being planted quite extensively; is very large, quite productive, of good quality, but many of the berries are "cox-comb" in shape and must be picked while the "combs" are green to bear transportation to distant markets. The Cresent Seedling proves very productive, is of medium size and quality, ripens *all* of its fruit early, will not carry as well, and cannot take the place of the Wilson in the Chicago market. Seth Boyden is early; of very good quality, quite prolific, but not firm enough for our markets. Many other varieties have been tried; some of which have proved desirable for dessert and home markets, but have proved deficient in some of the points requisite for distant markets. Many varieties were shown at the meeting of the Michigan State Pomological Society at Muskegon, in June of last year, among which I would mention the following as being worthy of trial:

Windsor Chief, introduced by Mr. Marvin, of Ovid, Mich.; Shirtz, introduced by E. J. Shirtz, of Shelby, Oceana county, Mich.; Seneca Chief; Sterling; Forest Rose; Cowing's Seedling; and Champion, exhibited by T. T. Lyon, of South Haven. The Sharpless has not been fruited in western Michigan. Sufficient is known, however, of this last named berry to render doubtful the utilizing of it as a market berry in the West.

Modes of Culture.

As very excellent and elaborate articles have been given to the public recently upon this subject, I will not be minute in describing modes of culture. In the early days of small fruit culture in this county but little attention was given to modes of culture. The forest was cleared and burned, and small fruits planted in the virgin soil and made a rapid and spontaneous growth, but as the domestic weeds were introduced, and plants became "massed," more thorough modes of culture became necessary. The expensive and laborious preparation of the soil, which is required on wet heavy soils, is not necessary on our sand loam table lands, and mulching, for winter protection, which may be a necessity in most locations east and west of us, is not practiced here, as our strawberry fields never winter kill. A light mulch of manure applied in the fall, or early winter, is always beneficial, but the application of large quantities of strong fertilizers induces a rank growth of foliage at the expense of the fruit. Planting is done in the spring. The "hill" or "narrow row" system of cultivation is usually practiced with the finer varieties, but the Wilson, and varieties which reproduce rapidly from runners, are generally cultivated by the "matted row" or over-all-the-ground system. The Jucunda and Triomphe may, with thorough cultivation, occupy the ground five or six years before renewal, but the best Wilsons are produced from plants of but one year's growth, and the most successful growers take but one crop of Wilsons. By this method the ground is rendered as clean as possible the previous season, and the plants placed at a distance of three and one-half feet "each way," which admits thorough cultivation in transverse directions with the "three point" shovel plow, until about the middle of August when all runners are allowed to take root, and the ground remains undisturbed until after the crop is gathered the next reason, when the field is plowed clean, while the plants for the ensuing crop are being cultivated on other fields. By this mode of culture very large crops of the finest Wilsons are grown, the plants do not become thickly massed, the fruit is large, the last berries are of fair size, and the cost of cultivation is less than by other thorough methods. In contrast with the one year method, I am sorry to be obliged to notice the ten-year system, or the gathering of berries from old, matted beds which have received no cultivation during several years. This mode of no culture is not general; but unfortunately temporary tenants have been induced to glean the old fields, and fill the market with "little, hard, sour things," thus casting obloquy on Michigan fruit growers "in general," and the Wilson's Albany berry "in particular." It is hoped, however, that with the advent of "better times," Chicago epicures will appreciate and pay for good fruit, and that modes of culture will be adopted whereby Berrien county will grow more and better strawberries from less than one-half of the acreage now occupied.

Blackberries.

In the spring of 1861 D. N. Brown planted a "trial patch" of Lawton blackberries on his fruit farm four miles south of St. Joseph. The result exceeded his expectations, and in 1864 he had several acres in bearing. Prices ruled very high in Chicago—from 25 to 40 cents per quart being readily obtained. Blackberry culture then extended rapidly, large crops were grown, and in 1868 a glut in the Chicago market occurred, large quantities going to waste. Mr. Brown utilized the crop by manufacturing forty barrels of wine. About three pounds of white sugar were added to the gallon of pure juice, making a wine which (with age) proved valuable for medicinal purposes, and sold readily in markets where introduced at $3 per gallon. Repeated loss of blackberry canes on the lower levels by "winter-kill" has discouraged the growing of the Lawton berry excepting upon high grounds contiguous to the lake. In the most favorable locations a total failure has never been known, while a half-crop in such locations, by hard winters, is attended with a total loss of the crop in most inland locations. The Kittatinny is quite extensively grown. It will survive a very little less degree of cold than the Lawton; is very little earlier, but is not so good in quality and does not continue so long in bearing. The Wilson blackberry has proved profitable with some growers. It is a half-running, half-hardy plant; produces very fine, large fruit, which matures early, and "at once." Winter protection is necessary in most locations, but fermentation is sometimes induced, and the germ of the fruit destroyed, by excessive winter covering. Bending over and covering with earth the young canes of the Lawton is practiced while the plants are young and the canes small, but is impracticable when the canes become older and stronger. The Snyder and Dorchester are hardy, but are inferior in quality to many of our wild varieties. The blackberry is indigenous to light, porous soils, and when well cultivated upon high grounds, which are contiguous to large bodies of water, or adjacent low lands, has proved a profitable fruit for market. The area of lands, however, even in our favored lake shore country, is very small upon which the best varieties can be grown with profit. In consequence of the frequent admonition of fruit dealers, to "ship fruit green and hard," many of our finest fruits go upon the tables of city consumers in an undeveloped condition, and are not properly appreciated. The Wilson strawberry and Lawton blackberry "turn" several days before maturity, and when sent to market immediately after turning dark, the Lawton berry will turn red when exposed on the market. Knowing that the Lawton berry must become fully ripe before its delicious qualities can be appreciated, the most careful "marketers" allow three and four days to intervene between pickings, and berries which may be too hard or too soft are excluded.

Raspberries.

The Doolittle Black and the Philadelphia Red were extensively planted in the Lake Shore country, about the year 1865, and several large crops being produced in succession, the market was over supplied and a decreased production ensued. Other varieties have been introduced, and the supply is usually fully adequate to the demand. Extreme warm damp weather at the time of marketing has a very depressing influence upon the condition of the market, as this fruit will mass and mould during such weather, before it can be consumed in distant markets. The Mammoth Cluster is now the favorite black variety. The Kirtland is a very early berry, bears transportation better than other varieties, and with the requisite thorough cultivation has proved quite remunerative. The Clark has been planted extensively, but will not produce sufficient to pay for cultivation, and has therefore been abandoned. The Herstine is a fine large berry, but is only half-hardy, and is not extensively cultivated. The Philadelphia has been the principal variety grown, but the fruit is poor and soft; the old plantations have died out from natural causes. The Turner has been planted extensively during the past two years. This is not as prolific as the Philadelphia, but is a very handsome, light-red berry, and will probably retain the first place as a market berry, until superseded by a new and better variety. Dried raspberries command good prices, and surplus products of this fruit are being utilized by different modes of evaporation.

Conclusion.

As a detailed and elaborate description of different modes of cultivation, pruning, insect enemies, etc., will occupy too much space for this paper, I will conclude this subject with a brief notice of the wild fruits of the county.

In the year 1861 nearly all of the Lake Shore fruit region was occupied by dense forests. The light soils in the vicinity of the lake were interspersed with large acres of wintergreen vines, whortleberry bushes, and a few marshes contiguous to the lake produced excellent varieties of cranberries; giant grapevines hung pendant from the highest trees; tangled masses of vines formed huge canopies over deep, dark ravines. Wild pigeons, pheasants, and turkeys partook of the wild fruits—unmolested and unforbidden. No wild blackberries were found in the unbroken forests; and no raspberry canes were found by the early settlers. With the advent of the fruit grower, and the cultivation of these fruits, the seeds were disseminated by birds, and wherever the woodman's axe, or fire, let in the light of the sun, wild berries came into existence. The extensive range of steep, cone-like hills, which border the lake south from the Grand Mar several miles, were overrun by the great fire of 1871, and almost denuded of the dense under-growth and heavy timber, thus preparing the soil for the wild berries which soon covered the hills. Many of the wild berries are seedlings from cultivated varieties, and a few wild plants have been selected which may prove of value to small fruit cultivators. During prolific seasons hundreds of people find remunerative employment in gathering wild fruits and shipping them to Chicago market. The best cranberry marshes have been purchased by intelligent cultivators, and the crops are being largely augmented by cultivation and propagation. The wintergreen berry is impervious to summer's heat or winter's cold, and many hundreds of cases are gathered during the winter and spring months, and sent to the Chicago market.

Not having the necessary data at hand, I cannot give statistics showing acreage in small fruits, aggregate amounts shipped, etc., but while a large part of our county is second to no other in the production of general farm products, with the advantages heretofore alluded to it must always remain the banner small fruit county of the northwest.

The subject of marketing fruit, fruit packages, etc., is one of great importance to Michigan fruit growers, and should supplement this paper; but as I have occupied so much of your time I will defer this subject until a future occasion. I would ask the indulgence of brother fruit growers in other localities, who, by reason of a different soil, and climate, may differ from me regarding modes of culture, varieties, etc., as I have consulted no one, and have given only my observations and experience in "Small fruit culture for market in Berrien county."

DISCUSSION.

Prof. Cook says he has heard the Gregg Raspberry very highly recommended in Ohio.

Mr. Omer, a grower, said it was the most hardy berry, and was also the best variety they could find.

Mr. Brown.—We have heard of that berry in Berrien county, but we do not know that it has been tried.

Mr. Roe.—Would like to know what experience the speaker had had with the Snyder Blackberry?

Mr. Brown said the Snyder had been tried on their light soil and had been discarded as a poor berry. It was hardy and prolific.

Mr. Gillett asked why he thought climate affected the raising of fruits?

Mr. Brown said there were obvious reasons. One reason was that small fruit would not stand a very great degree of cold; on the lake shore the cold is not extreme. Again, they did not suffer extremes of cold, repeated thawing and freezing.

Mr. Gillett.—Do you think the same culture is needed on clay as on light soils?

Mr. Brown.—In a great degree, yes. There must be thorough cultivation in all cases.

Mr. Morgan wanted to know the mode of cultivating the Blackberry for the first two or three years.

Mr. Brown.—We plant about four feet apart each way and in rows; cultivate as for corn. In the second and third year we follow out the same method, cutting back the old plants in the winter and cultivating the new canes in the summer. We do not allow too many canes to grow. A thrifty growth of canes is apt to affect the quality of the fruits.

Mr. Helmic wanted to know about the soil on which the Ohio Blackberry, the Gregg, flourishes so well.

Prof. Cook said the soil was heavy clay, thoroughly underdrained.

Mr. James Cassidy, the College Gardener, read the following paper on

PROGRESSIVE HORTICULTURE.

Horticulture is a practical art, and is generally regarded as coëval with the human race; for we read in Holy Writ that God made a garden and placed man in it to care for it, but a breach of the primal law caused his expulsion therefrom, and condemned him to eat bread by the sweat of his brow. That a system of horticulture was practiced thousands of years ago by the Egyptians is evident from the paintings on their ruined temples, and also from the fact that it was necessary, in order to sustain the densely peopled valley of the Nile. From this wondrous land of fruits and flowers, the art was carried into Greece, and there received the greatest attention. From Greece, or Asia Minor, it was carried to Rome, where it was the chief reliance of the people. Of the Roman gardens we have full accounts; the branches of horticulture then known to them seem to have been carried to a high degree of perfection. The gardens of the ancient Asiatics, however, in no way resembled those of the present day, the chief object in all Oriental enclosures being to produce such vegetables, whether decorative or edible, as were necessary for either public or private purposes, their idea of a pleasure garden being a grove of trees for the purpose of shade: and probably this idea of planting for shade first suggested plantations of trees. The ancient patriarchs subsisted chiefly by their flocks, and the simple fruits and vegetables that flourished at that time, and as population increased in numbers they colonized for their better protection against those more powerful than themselves, at the same time directing their attention to the cultivation of the soil and the practice of the mechanic arts. But for centuries after this, so common was the practice of war and depredation that people dared not live in other than fortified places cultivating an enclosed patch of ground to serve their most pressing wants. It would seem as though the various fruits of the earth would entice the attention of those people to their improvement; but so dominant seemed the bent of humanity on the acquisition of power and its direct promotion as to exclude all else save the arts of architecture, sculpture, and painting, the pursuit of the latter being due, perhaps, to the people living in cities. During the dark ages horticulture, like other peaceful pursuits, languished, and it remained for the Saracens to revive and carry it into France, Spain, and Sicily, and in later times every monastery had its well-kept garden. From Spain the science spread all over Europe, England being among the latest to receive it. Many of the ancients wrote treatises on gardening, but through lack of scientific knowledge, and the prevalence of popular superstition, error, and prejudice abounded in all their writings, and I am sorry to say that many of those souvenirs of a gone past prevail to-day. But with the spread of civilization the mind expanded, experiments were instituted, and inquiry began in relation to the principles of vegetable life, and improved husbandry. Accident, also, contributed not a little to help produce the splendid achievements of the present day. Horticulture is now a science which has, and is now receiving the closest attention from many of the able scientific men of our time; and as we look at the vast field of nature we are struck with awe and admiration, and things as common as the air we breathe, when examined by the light of science unfold such pleasing features as to make us wonder at our previous lack of appreciation. Horticulture belongs to civilized life; when the home becomes a permanent abode, it is then that the necessity of sustenance demands the cultivution of the soil, consequently it has always received the greatest attention from overcrowded nations. Thus it is with China, France, Belgium, England, and many others, and in time it must become so with us, as under our laws and form of government we shall increase so in population as to be as overcrowded as any nation on earth. All over Europe to-day, governments and individuals are looking to horticulture to supply the necessaries of life, rendered more immediately imperative by a variety of causes in different countries.

Mr. Gladstone, in a recent address on horticulture among farmers, said that

England imported $15,000.000 of vegetables per annum, all of which might be saved to the country by better land laws and by stimulating the soil to increased production. Horticulture, like agriculture, was practiced for ages before any attempt was made to systematize its methods and their results; but it is now conceded that the cultivation of the soil has its general principles as well as its general details; that there must be books in which facts are stated, and rules systematically laid down for the highest development of the art. It is scarcely necessary, then, to say that a new era now exists in the cultivation of gardens as well as fields, and as the subject is one of the highest interest, the necessity for advanced and regular efforts for its success is daily becoming better understood. Within the memory of many now living there was not an agricultural paper published in this country, the first effort in this direction being the American Farmer, published in 1820. Now there are many monthly and other periodicals devoted to horticulture whose writings are well up with the times. Nor is this all; thousands of secular and religious papers have special columns on this subject, without which their success would indeed be doubtful.

With this brief notice of the early rise and progress of horticulture, I will now somewhat hastily view its present condition and future prospects under three heads: the economic, the ornamental, and the scientific. Economic horticulture comprises fruit growing, vegetable gardening, and tree growing for shelter, ornamentation or other economic purposes in the various industries of the world. Fruit growing is a branch of horticulture very attractive to the great body of the people, and as a rule the most profitable, particularly when associated to some extent with vegetable gardening near large cities and towns. Fruit culture and vegetable gardening border closely on agriculture, and require the best skill of the cultivator, as they comprise the whole question of commercial and other fertilizers which are so intimately associated with their successful prosecution. They also require special attention to soil and climate, as well as demanding foresight and a very thorough preparation of the soil for the best success; but where this has been omitted frequent cultivation will give excellent results, and for many plants is almost a sufficient substitute. Forestry, in its relation to agricultural economy, in so far as it helps us in reaching the best system of tillage, is of special consequence to agriculture itself, and until this, and the subject of drainage, also the importance of entomology, is fully recognized by farmers and horticulturists, the best possible results cannot be reached by them. The planting of trees, both for profit and ornament, has long engaged the active attention of European nations. The present forests of England are said to have been planted by the hand of man. The highlands of Scotland have also been replanted by the untiring labors of past generations, rendered necessary by the recklessness of the people at one time in destroying the timber. Planting trees is now recognized as an important aid to the future prosperity of any country; climate, scenery and the comforts of life depending in no small degree upon the performance of this duty. As planting trees for ornament comes late in the progress of horticulture and does not promise immediate results, it has not received that attention in this country given it by governments and individuals in Europe; yet its importance is daily becoming more apparent as we deplore the vicissitudes of climate caused by the destruction of our forests, till danger now exists that like Palestine our country will be shorn of its future abundance.

One of the most hopeful evidences of progress in the present day is the rapid extension of orchards and useful trees all over the country, and the desire for improved varieties of the various products of the garden. Some people are still fearful that fruit-growing will be overdone; fifty years ago the same result was predicted, but the anticipated result has not yet come, nor do we believe that it ever will, for various reasons. Among which we notice, that the increased taste for gardening, which is such a marked feature of our time and nationality, augments the demand for first class fruits and vegetables, and with this increased consumption, producers of a first class article need have no fear of an over supply. The natural productions of the earth are simple, and it is doubtful whether many of the grains, roots, herbs and fruits when first discovered were palatable food for man in a state of civilization, certainly in their native wild state, they hardly resemble their present appearance or value. The peach was originally an almond, but now changed by the skill of man into sweet and melting flesh. The pear has been cultivated for two thousand years, but it is within the past seventy years that its fruit has been brought to its present high state of excellence. Dwarfing the pear by grafting it on the quince is also an art of modern growth. The plum, cherry and apple were as we still know them in their native wilds. The wild pea and bean, the potato, and cabbage, with a leaf hardly larger than that of the ordinary clover; and in fact all our esteemed fruits and vegetables had but little to recommend them, but gradually and surely have their natures been meliorated by breeding and cultivation, and made subservient to the wants of man. The earliest efforts for improvement in horticulture in America were made by nurserymen and fruit growers, meeting in convention and founding societies for the advancement of pomology, and it seems to me that the future progress of horticulture must depend largely upon the work of these societies, and that of the professonal horticulturist.

Here the latter can give to the public the result of his experience and observation, and find cause for his failures in the success of his neighbors and learn wisdom from those who by experience and observation have learned the secrets of nature. And while we notice with pardonable pride the progress made each year, yet are we fully conscious of how much we have yet to learn of her hidden treasures? We know that plants absorb and utilize more or less of certain elements as they are differently constituted, and yet the coloring of their leaves and flowers is still a profound secret to us. Our greatest progress has been in pomology, as the works of Downing, Warder, Wilder, and the records of the American Pomological Society, amply testify that in this particular department of horticulture we stand unrivalled. Still at the west and northwest, horticulture in its broadest sense is still in its infancy; its most important triumphs have been scored in the vineyard.

Only a few years ago it was thought that the Isabella and Catawba were the only grapes adapted to the northwestern states; now we have many others. Certain varieties of the American grape belonging to the species *riparia* and *æstivalis* are now the chief reliance of French vineyardists on account of their ability to resist the phylloxera. The American potato is also extensively cultivated in Europe for a variety of purposes, particularly by the Germans, who are its most successful cultivators. The shrewd Germans are evidently not troubled much with the mania for new varieties; they exercise their good common sense in confining their attention to such kinds as they have proved worthy of cultivation. The consequence is that they now control the English market, and teach us this important lesson: to avoid the extensive planting of new varieties until their adaptability to our soil and climate is fully proven.

We say, then, that fruits and vegetables should be cultivated by every family, as well for their hygienic tendencies as for their aid in satisfying our natural desire for them, without clandestinely enjoying them at the expense of our neighbors.

Ornamental horticulture includes floriculture, ornamental planting, and landscape gardening, and as it appeals to the æsthetic part of our nature must necessarily make slow progress in a new country, where the immediate wants of life are first to be considered. In flowers our poets have found their most beautiful illustrations, and most true and fanciful sentiments. The garden has been to them a book of inspiration. Flower gardens are associated in our minds with all countries, and all periods of time. The most distinguished men, who have agreed in nothing else, have agreed in all ages to delight in gardens. The cultivation of flowers in most instances is easy of acquirement. Nearly all plants may be propagated from layers, or cuttings; others multiply by suckers, and the rest from seed.

The primitive rules applicable to vegetable gardening hold good in the cultivation of ordinary flowers, as any soil adapted to the production of the former is equally so to the growth of the latter. Perhaps no country in the world is richer in her natural flora than that of North America; particularly in flowering shrubs and herbaceous plants. In elegance of shape, and brilliance of color, many of them will bear a fine contrast with the exotics of other countries. A leading fault in many flower gardens of the present day is the lack of a proper selection of kinds, and a bad method of arranging them. The most satisfactory gardens are those where but few kinds are grown, and these should afford a continuous display of color and perfume, and have a neat and agreeable habit of growth. The old method of mixing plants of conflicting habits of growth should be discarded for the modern style of grouping and massing the colors in separate figures. No disposition of plants can be made that will be more effective than this. The art of arranging flowers is a very interesting study, and such as have a correct taste will no doubt succeed the best. A Belgium journal has given us some interesting figures, showing the rapid increase in our knowledge of the vegetable kingdom. In the bible one hundred plants are alluded to. Linnæus in his day described over seven thousand. In the beginning of the present century Persoon described 25,000. In 1863 Bentley estimated the known species at 125,000, and doubtless many more await the eye of human inspection, and possibly exceeding in beauty or fragrance any yet introduced. Almost every living animal and vegetable product is utilized as food in some part of the world. In China over four hundred species of plants are considered edible, and in the whole world the edible species exceed four thousand. All human beings appreciate beauty in some way or other. The taste for sleek cattle is often shown where the house is poorer than the barn. Still it is not claimed that all have equal capacity or desire for house adornment; in fact there are many horticulturists who see more to admire in a cabbage patch, than in the most beautiful lawn or flower bed; their plane of beauty in any product of the soil being what it is quoted at in prices current. But these prejudices are being rapidly overcome by the convincing evidence of successful results. People begin to see that the value of a farm depends not so much on the number of its acres, as upon its mode of culture, productiveness, and such surroundings as add to its comfort and respectability. The objection is often urged that ornamentation is a bill of expense that but few people can afford. To this I answer that much beauty may be given a place, with but little expenditure of money; indeed more than enough is often spent injudiciously, just for lack of a little knowledge. Every tree grown for ornament adds far more than its cost to the value and comfort of the farm. The home surroundings that are bleak and unadorned will either not sell, or must go at the lowest figures, consequently instead of not affording to ornament his home with things that are agreeable to good taste, the progressive farmer cannot afford to leave it undone, if he would escape loss. All this offers a strong argument for home adornment, both by reason of the great public interests at stake, as well as by the evidence we have that but little progress can be made until we can secure the intelligent coöperation of our farming communities. If we are backward in any branch of horticulture, it is that of landscape gardening, which should never be divorced from any system of education intended for civilized society. It is true that nature has given us many scenes of great beauty, and this has to some extent relieved us of the necessity of creating them by art, but it is equally true that we lack purpose and design in our efforts in this direction, which at once impresses the importance of the diffusion of that knowledge, that shall lead to better results. The garden is at once a source of profit, substantial comfort, and high intellectual enjoyment, because it contributes so largely to the wants, enjoyments, and luxuries of life; that view it as we may, its practice affords such grand objects for contemplation, that whether we look at it as a means of supplying our wants, or gratifying the senses, or improving the mind, it must ever be a subject worthy our earnest attention and consideration.

Scientific horticulture has for its primary object truth and an increased knowledge of the science. It comprises collections of fruits, flowers and plants generally, not so much for profit or ornamentation as for experiment and the fostering of scientific taste. Comparatively little is known by people in general as to what extent plants may be improved by a systematic and intelligent course of breeding. Individual effort is commendable, but few people have the time or money to carry it out for a sufficient length of time in order to reach satisfactory results. A kind providence has endowed plants and animals with a capacity for improvement, and to man he has given intelligence for their development. Nearly all the natural productions of the earth are capable of improvement by judicious selection and cultivation. It is true that nature has been lavish with her favors; she has given us grains and vegetables that are sustaining and agreeable; flowers and fruits that are attractive to the eye and to the palate. These are but the beginnings from which a progressive horticulture has sprung. We may be said to have commenced a new era in horticulture with the knowledge of hybridization in the production of new and improved varieties of plants, an era that exemplifies a most beautiful law of nature by which improvement in its vegetable products may be carried to a high degree of perfection. Who would recognize in the Baldwin apple the worthless crab, or in the delicious pear the austere wildling of our hedge-rows? Who has not pitied the ancient Bretons who subsisted upon the miserable colewort from which the modern turnip, cabbage and cauliflower have sprung by cultivation and selection? Who can estimate at their true value the observations and experiments of Darwin or the elaborate work of Lawes and Gilbert in agricultural chemistry? To hybridization, selection, progressive evolution and the practical application of this knowledge to the purposes of the cultivator is husbandry and horticulture indebted for the improvement in those plants and animals with which they have to deal. Much has already been done in this direction, and we have the most cheering assurance that every section of the country will have fruits adapted to its particular locality. The adaptation of plants to diversity of climate, and their distribution over the earth,—why some are able to adapt themselves to almost any change of location, and others are confined to certain well defined limits, is a question so profound that few have any definite knowledge of it. Mankind will often endure the most violent changes of climate, but the changes that plants will endure is fixed by a never changing law,—not but that plants will sometimes endure extremes of heat and cold foreign to them in their native home,—still we must not suppose that time will accomplish a constitutional change in them. It is enough for us to know that we can obtain fruits from seed adapted to the region we inhabit. But the non-adaptation of fruits to our several localities is not the only difficulty we have to contend with. The alarming increase of noxious insects inflicts a loss upon the country, according to Prof. Riley, of not less than three hundred millions of dollars annually, a greater loss than Napoleon, when in the zenith of his fame, ever inflicted upon an enemy.

There are three classes of diseases common among plants: first, those due to insects; second, those due to vegetable parasites, the most common of which are the fungus growths; third, a class of diseases due to a variety of causes, and which may be called real diseases. The numerous species which derive their sustenance from the vegetable kingdom have long been the most dreaded by the tiller of the soil. Although dealing in small things, yet entomology is a vast science, for Prof. Riley computes the number of insects as exceeding by ten fold that of all other animals combined. Of late years human skill has done much to help mitigate those evils that escape our notice by their minuteness, elude our grasp by their agility, and defy our skill by their countless numbers. Every cultivator of the soil should be familiar not only with the botany of the useful plants, but of the weeds also, that he may the more easily exterminate them. The cultivation of plants and flowers, to understand how they are nourished and supported, and the soils best adapted to their natures; to understand their several parts and their relationship to each other; how they may be perpetuated and hybridized. This is practical botany. We look upon horticulture as botany applied in practice; and just as the horticulturist departs from its teachings, so does he impair his own success. The horticulturist is indebted to the botanist for the analysis and determination of newly discovered plants, for advice in relation to grafting, and hybridizing, and to the physiologist for points in relation to pruning, forcing, and many other things. On the other hand, who has such opportunities as the horticulturist for studying the habits of plants, their value for food, ornament, or other economic purposes, or in supplying facts for the physiologist in relation to hybridization? The practical horticulturist might confer a benefit on science that is hardly estimable by a careful record of important facts, his every-day work being largely a matter of personal experience and observation; and this is, to some extent, a measurable quantity in every lifetime. It is clear, then, that the closest union is desirable to both parties in order to render the best service to a progressive horticulture. We do not say that science alone will teach us horticulture, since it is an art of practical experiments and actual experiences, not to be learned in the class-room only; but I tell you what it can do, it will enable those who have given it some attention to overcome difficulties that may puzzle the man who has not this advantage. But aside from its utility in the practice of horticulture, we do desire to see every tiller of the soil give some attention to botany, an acquaintance with which cannot fail in promoting his best interests.

A knowledge of the soil and its combinations and capabilities lies at the base of all true culture, and is a great aid to its successful practice. Since the application of chemistry to agriculture many important facts have been determined; errors corrected, and correct principles laid down of great value to the husbandman. The science of Meteorology is so intimately associated with that of horticulture that a better knowledge of it than we now possess is very desirable. The study of carefully kept records as to the action of the elements, also the influences of large bodies of water, and the effects of high elevations, and deep valleys, upon the temperature and moisture of the atmosphere, will no doubt in time reveal the causes that influence weather, and perhaps throw some light upon changes in public health, with which weather no doubt has somothing to do. The question as to whether the drought induced by severe freezing is not more fatal to plants than the mere lowering of temperature, is worthy of more attention than it has yet received. The vagaries of the past severe winter among the floral treasures on the Continent of Europe tell a tale, and point a moral, in this direction, which we think will not be lost sight of by European horticulturists in the future. We already know that many tender plants may be saved from injury during severe weather, by merely soaking the ground around them with water, and then mulching with leaves or other available material, thereby arresting the escape of heat and moisture from the soil, and this acting as a protection against drought rather than cold. The average temperature of a country avails us little in determining the special conditions which affect the welfare of plants. To understand these conditions it is wise to place less reliance on averages and more upon specific facts. There are many plants which will endure the most rigorous winters of France, that utterly fail in the more moderate climate of England. By such examples are be warned not to trust too confidingly to averages for our estimates of climate in relation to the growth of plants. Agriculture and horticulture combined, have often been the means of great national prosperity to many countries, as for instance the cultivation of the tea plant; in early times it was taken as a curiosity, and sometimes as a liquor, and its culture was exclusively monopolized by the Chinese; but now by the combined efforts of agriculture and horticulture it has become a staple industry of India. Another plant, the Cinchona or Quinine tree, an article of prime importance to humanity everywhere, is largely cultivated in India. I might also mention the Eucalyptus, the rubber trees, and many others, as having a somewhat similar history. It was said of all those plants that they could not be established as an industry in any other country, and probably would not have been but for the efforts of the horticulturist supplemented by the larger labors of the agriculturist; and I doubt not but that the future history of American agriculture will record the permanent success of some such industry, in a portion at least of her vast territory.

The Corinthian capital also owes its existence to the vegetable kingdom, because it was from a plant drooping over some neglected stone that first suggested to the Grecian architect the idea of that most graceful of all architectural orders. The thought now suggests itself, how a knowledge of horticulture may be made more general and useful than it is at present and I shall indicate three methods by which I think this may be in part acomplished: First, by instruction in horticultural science in our schools. Although the importance of agricultural pursuits is admitted, it is safe to say that there is not a school or college, outside the agricultural colleges, where a moment is devoted to an explanation of those familiar operations of the farm and garden to which we are indebted for our daily bread. May we not hope, then, that the time will soon come when the school garden shall become an educational force in our country, when instruction in horticulture shall be imparted to the young in our schools who are especially likely to be influenced by its teachings; so that education by labor as well as by study shall become a pleasure and not a task. Second, to our horticultural societies and to the professional horticulturist do we look to spread and enforce a broader knowledge and appreciation of the art among the people, both by precept and example, so that their influence may stimulate the enlightened taste and public spirit of communities into a spirit of inquiry and improvement. Agricultural societies have done much in this direction, but once a year is not often enough for farmers to come together and compare notes. The tiller of the soil needs to study and improve his methods the year through, and no better plan now suggests itself than the organizing and sustaining clubs for discussion and mutual improvement. Nor do we consider it advisable to confine the membership of such clubs to tillers of the soil exclusively, because it will often be found that many business men and mechanics are much interested in agricultural matters, and often have gardens in which the choicest fruits and flowers are cultivated with care and intelligence; certainly no class are more desirous of uniting with farmers and horticulturists in this matter than the intelligent business man of the country. Interchange of thought and opinion between people engaged in different pursuits is mutual commerce and a great mutual benefit. We are glad to notice the increase in numbers and influence of these clubs; they cannot fail in promoting the best interests of communities wherever they exist. Third, upon the press rests the well being of a people; upon journals devoted to the technology of particular arts rests the progress of that art, because the intelligence of communities is formed and fixed by what they read. We need, then, in this direction, not only more newspapers, books, and essays, but more concentrated teaching, more good examples to imitate.

Looking at horticulture in its broadest sense we see that it must in some way reach nearly every home. Differ in other matters as we may, we here meet on the broad and comprehensive platform of universal sympathy and common manhood. As an educating power it tends to give stability to its followers, binding families to their homes, providing shade and shelter, both from the heats of a summer sun, as well as the chilling blast of winter's storm, while at the same time it surrounds us with beautiful lawns and trees, and beautifies our windows with plants that cheer us with their blossoms in winter. They are living things, hence it is that we love them, for the advantages secured by permanent occupation cannot be measured. It is enough for us to know that the highest form of civilization can only be reached by such a people. Horticultural pursuits quicken thought and observation as its domain covers the whole field of natural science. Not science as taught in the class-room only, but to nature herself and its practical application to the wants of man. It is not enough that we understand the theory of hybridization or the classification of plants, but its practical application to the process of horticulture, the laws of nature deriving most their importance from a practical application of their principles. The mysteries of the microscope have a powerful hold on the imagination of the scientist, but to the farmer or gardener whose hopes may be blasted in an hour by the presence of some vegetable parasite, they assume a practical importance of the greatest moment. Questions of the most vital importance are constantly arising which shall be answered either by your own experience or that of others, the result cannot fail of being profitable to your powers of study and observation, and a practical mental culture will be acquired in a large degree measured by the will of the man. The work of the horticulturist also favors a denser population than that of ordinary farming, as it brings residences closer together, and consequently larger privileges accrue to individuals and communities; he also exerts a great influence on himself and others in that he labors in the most efficient manner in supplying the physical wants of man's nature; but there is a much higher and wider work in laboring for the higher wants of his nature. The great truth that man shall not live by bread alone, has been accepted in its broadest sense. There can be no question but that horticulture in America has a great future before it which we can materially strengthen by developing those features which our climate and people seem to favor rather than by following European methods too closely, thereby establishing a school of horticulture of our own. One of the best pieces of advice Sir Walter Scott ever gave was to plant a tree: He said when you have time plant a tree, it will be growing when you are sleeping. Plant trees and flowers then about your homes; plant orchards, plant forests, lay out your grounds with a view to the future, for around them shall cluster the purest, most refined and rational enjoyments of life, and do not be deterred by the selfish fear that you may not participate in the harvest.

Prof. Cook gave an unwritten lecture on the "Hessian Fly," much in the same line of thought as his lecture published in the Report of 1877.

Mr. Levi Sparks, of Berrien, read the following paper on

CORN CULTURE.

The subject assigned to me by the committee for discussion is of such a character and so commonplace and universally understood—or supposed to be—by all present that I fear I shall be unable to give you any new thoughts or present the matter in a way that will greatly interest or enlighten.

The subject of "Corn Culture" is almost without exception supposed to be one of the easiest lessons to be learned by the farmer. Because the character, structure and habits of the corn plant are such that it will grow and even thrive to a certain extent under almost any circumstances, and in almost any kind of soil, every mere novice at farming is ready to conclude that he understands all that there is to be learned about corn culture, and, like Horace Greeley, is ready to tell you what he knows about farming in general and the cultivation of corn in particular.

Most of our Michigan farmers, from the consideration that wheat is the great staple of our State, or at least is the commodity that can the most readily be converted into cash, have devoted all their energies towards increasing the number of acres of wheat on their farms respectively, and have apparently lost sight of the fact that in the number of bushels produced in the United States, as well as the important and varied uses into which it is converted. Corn constitutes by far the more important production of the two. Hence the importance of its production or cultivation being better understood.

From a hasty examination of the statistics I learn that for the year 1877 the number of bushels of wheat produced in Berrien county was 530,122, and for the same year there were 28,523 acres of corn raised in the county. Estimating the same at 30 bushels per acre would give us a grand total of 855,690 bushels of corn, an amount almost twice as great as the wheat crop of our county, and approximating the same in value.

The most discouraging feature exhibited by the statistics is the fact that with all our improvements in farming and farm implements our average per acre is steadily decreasing, and doubtless the same is true of other counties. In 1873 our average yield of corn per acre was 29 85-100 bushels; in 1863 it was 30

51-100 bushels, and in 1853 it was 33 14-100 bushels, being a loss of almost four bushels per acre. I have been unable to ascertain our average yield later than 1873. You will please to remember these figures, as I shall have occasion to use them again before I close.

It will be my purpose to discuss the subject assigned to me so as to demonstrate to you, farmers of Berrien county, how we can restore our rank, not only to the 7th (where we stood twenty years ago), but to show you how we can stand at the very head of the list of counties. For with our favored location and climate and a soil proverbial for fertility wherever the St. Joseph valley is known, we should be content with no inferior rank.

I believe that the average per acre for the entire State is too low; that it is entirely and disgracefully low; that there are but two reasons why it is so low, viz.: ignorance of the nature and habits of the corn plant and a lack of proper cultivation. It is true that we have not in Michigan the rich bottom lands of the Sciota or Miami, or the climate of southern Ohio or Indiana, but notwithstanding this I affirm that with proper culture the average Michigan acre can be made to produce very nearly if not fully double the present average rate.

No farmer who raises corn on any of our Michigan soil that is at all adapted to its cultivation should be content with a less yield than fifty bushels per acre. And if he is the fortunate owner of one of our fertile Berrien county farms he should not be satisfied with less than sixty, sixty-five, or even seventy bushels per acre; and a few of our best farms are capable of producing seventy-five or eighty bushels, with proper cultivation. The conditions essential for producing a good crop of corn are so various and differing so widely in character, and yet all of them so important in their respective uses, that it is important that they should all be considered. But in the limited time allowed me it will not be possible for me to do anything further than merely allude to a few of them.

First, let me say that the soil should be of the right character, possessing in a high degree the material upon which corn is nourished. Again, the season must be suitable, with sufficient but not too much moisture or rainfall. The plowing *must* be done at the right time and with the right kind of a plow. The seed must be well selected. Planting must be at the right time and in proper manner, and the subsequent cultivation at regular intervals, with implements suitable for the purpose. You will readily see that I can only refer specifically to but a few of the points named. Hence in order to discuss the subject methodically I will first consider the preparation of the soil or seed-bed. Next, the time and manner of planting, and in the last plan the proper mode of cultivation.

I ask you to remember that I am to treat of the subject in a general way, of farms as they average and the seasons as they occur, and you must not expect that what may follow will be applicable to every individual or farm. In our latitude the farming season being short and work always pressing, we almost invariably begin plowing for corn too early. There are a few crops that will grow and flourish on land that is cloddy or sodden. Not so with corn; to succeed it must have a loose, mellow or porous soil and sub-soil, so that the tender fibrous roots can permeate the entire surface and feed upon the dainties that nature is continually compounding only in a soil of this character. Such a condition of soil is impossible if the plow share is driven through it before the accumulation of water induced by the winter snows and spring rains has had ample time to disappear. I repeat it because it is fundamental and of the first importance. A good thrifty growth of corn you cannot secure on a hard cloddy field. A warm, rich, mellow soil you must have to get a good growth of corn. This you cannot have if you plow too early. I know the temptation is great to begin plowing early, and very thrifty farmers dislike to be last in planting. Better by far is it to be a week or ten days behind your neighbor with your plowing if by this means you can come out ahead of him in the fall fifteen or twenty bushels per acre.

Of course the rule suggested is not so important on our light sandy or loamy soils, but on heavy soils composed largely of clay it is imperative. As to the precise time that plowing for corn should begin, no definite rule can be given. The location and nature of the soil together with the season must determine.

Many a farmer while cultivating his corn finds it growing slowly and feebly. The stalks are slender and the blades yellow and sickly, and he all unconscious of the cause concludes that the season is not right or some worm or insect is preying upon it. Or perhaps it was not planted at the right time of the moon. When the whole secret and difficulty is he was so much afraid of being behind his neighbor that he began to plow when his land was not in condition for the work. He turned over the surface soil and left it cold and wet and cloddy. The rays of the life-giving sun, and the warm breath of spring, and all the chemical agencies compounded in the laboratory of nature, could not permeate it and fill it with the elements of plant life. Hence the young greedy corn, which is the grossest feeder that we produce on the farm, that must have food or die, finding but little to subsist upon begins to fade and droop. As to the time and manner of planting I will be brief as possible. Some of the arguments used relative to plowing are equally applicable to planting, and need not be repeated.

The great danger of planting (premising that the seed has been well selected) is planting too early, especially on our heavy soils. I feel reluctant to take this position, as late planting is thought to betoken a lazy or unthrifty farmer; but the truth compels me to do so, for by this means only can we increase our yield of corn to the point I have indicated. You will please to bear in mind that while I do not recommend too early planting, I am no advocate of too late or *very late* planting. But of the two, late planting is preferable. Let me tell you why I take this position. The laws which govern animal and vegetable life are in many respects similar, and in the growth and development from infancy to maturity there is a striking resemblance between the animal and the vegetable. Now every stock raiser knows perfectly well that in order to secure a large, healthy, and well-developed animal, it must be brought into existence with a strong, vigorous constitution, and that afterward such food or nourishment must be supplied in abundance as will conduce to its rapid and continuous growth; and most important of all, it must not be allowed to stop growing or, in common parlance, to become "stunted." If it should, all your efforts to restore it to its former growing condition will be futile. Do your best afterward, and you will produce a nine-hundred instead of a sixteen-hundred ox, or a two-hundred in place of a four-hundred pound pig.

The corn plant, although a vegetable, lives and grows upon nourishment—upon what it eats, if you please. All the difference between it and the animal is that in one case the food is supplied in a tangible form by the careful keeper, while in the other the elements and inorganic forces which support vegetable life are supplied lavishly by the careful hand of nature, but are hidden away in the soil for use when needed, imperceptible and but little understood by the masses, but just as real as the food that we furnish to our animals. Now the point I wish to make is this: the food to support the young corn will be furnished *only* when the conditions are favorable. Those conditions are a loose or porous soil that the air and warmth and sunlight and the gases and other useful elements can permeate and pervade. If we plant our corn before the earth has become thoroughly warmed, and rejuvenated as it were by the vitalizing force of light and heat, the seed will perhaps slowly germinate and the young plant will receive but just enough nourishment to cause it to spring up a few inches and then, like the tender lamb caught in a cold rain storm, it droops and withers, and for lack of nourishment it sometimes dies, and like the starved young animal it receives a shock from which it never fully recovers. "And what will the harvest be then?" Perhaps thirty bushels per acre, when sixty at least should and could have been grown.

A good crop of corn cannot be grown without perfect and *rapid* germination and a vigorous and continued steady growth throughout the season. These conditions you cannot secure if you plant in a cold or wet or hard cloddy seed bed, or in other words if you plant too early.

Again I would say, do not adopt the modern practice of "marking out" with a sled or other device that will merely mark the surface. I would favor the use of the planter were it not for this same fatal defect of leaving the grain too near even or with the surface of the ground. We read in the good book that certain seed which was good in itself and which fell perhaps on good soil "perished" because it had no depth of earth.

My experience of forty years active life on the farm has demonstrated that *invariably* those farmers who have taken the time to mark out their fields so as to drop the seed two or three inches below the surface were the most successful corn raisers. This may appear to be a small matter, but it is, I assure you, worthy of your consideration. The only objection is it requires more time to prepare the field for planting in that way. But as the result of a whole year's labor depends largely upon little things we cannot afford to be indifferent thereto.

Mark the field both ways in rows three feet and eight inches apart and plant three grains in each hill. Or better still, plant four or five grains in a hill and after it is up thin out to three stalks in a hill and then cultivate properly, and I believe our average will be very greatly increased. Relative to cultivation after planting I will be as brief and explicit as possible. For reasons already assigned it is apparent that one of the essential objects in "corn culture" is to keep the earth in a proper condition to nourish the young plant, and this is to be done by keeping it constantly in a warm, loose or porous condition. The second and only remaining object being to keep under subjection the weeds and grasses that grow so abundantly during the warm months of May, June and July. If the plowing has been done at the time and in the manner described, the subsequent cultivation will be an easy and pleasant matter, for the soil will be loose and free from clods, and time will not have been given for the weeds to grow.

The first working must be before the plant has made its appearance above ground. Right here a majority of farmers make a very serious mistake. They plow and plant and then attend to other duties or pleasures for two or three weeks or longer, thinking all is well, while all the time the earth is becoming dry and hard, and the myriads of seeds in the soil are germinating and growing and sending out their millions of roots in every direction to lick up or absorb the vitalizing elements so much needed to feed the growing corn. As before remarked, corn is a heavy or gross feeder, hence it will admit of no opposition. It demands and must have the undisputed occupancy of the field.

And now that the warmth of June has brought the tender and beautiful blade to the light to drink from the warm humid atmosphere what cannot be fed by the soil through too tender rootlets, it is obvious that if left to itself it will be overrun and choked out by the foul and noxious weeds that infest even the best of farms. So now boys, the battle must begin in earnest. Constant, unceasing warfare must be waged and no quarter must be given these enemies of the corn crop until it is full grown and well matured. For the first and second working all that is required is to lightly stir the surface as that will be sufficient to destroy the weeds that are germinating.

For this purpose, *perhaps,* the riding cultivator is as good an implement as any. But for future work, when it becomes essential to do good and thorough work, to work close to the corn and stir the earth deeply, its use must be abandoned for a more perfect tool. I know that the boys and young men here will not agree with me in this position. It is so much easier to ride than walk, they say. Besides, it is more genteel, and is up with the times, they tell me, and is entirely too old fogy for them, all of which is plausible enough, for I am in favor of making the work on the farm as easy and pleasant as possible where it does not affect injuriously the results.

For good, thorough work, we have no implement now in use that will begin to compare with the common double-shovel plow, at least after the second working.

As I expect to be criticised on this point I shall expect, gentlemen, to be prepared to answer a few questions based upon the statistics, which are compiled and on file in the office of the Secretary of State, to wit: Why is the average per acre steadily decreasing? Why do we produce from four to five bushels less per acre than we did twenty years ago when our fields were filled with stumps and stones? and why does the production decrease in just about the ratio that the use of the cultivator increases?

There can be but the one answer: The implement is defective; and however useful it may be on the farm, it is not adapted to "corn culture."

But the fatal mistake made by most corn raisers, the error of errors, the crowning act of folly, and the blunder that robs us of at least a third of the results of a long season's labor, is ceasing to cultivate at the very time when the crop requires the greatest attention.

From the first to the middle of July the growing corn is in the most critical period of its existence. It is then beginning to bring to the light those majestic tasseled plumes which, waved by the summer's breeze, are to fertilize through that mass of silken threads, beneath the embryo corn soon to appear on the tender stalk; every power and function of the plant is now taxed to its fullest capacity. It needs all the assistance now that nature, art, and muscle combined can give it. To abandon it now is folly in the extreme. It is worse than folly—it is almost criminal. The work of cultivation should never cease until the stock is fully matured and well fortified against the long drouth that almost always begins about this time in the year. Better by far will it be to keep the boys in the corn field through July, even at harvest wages, than to permit the weeds to rob you of the rewards of your labor, or the drouth to dry up and wither the hitherto luxuriant crop.

And now, farmers of Berrien county, I am not vain enough to suppose that I have so fully and clearly established every position taken as to cause you all to agree with me. You are intelligent, thinking farmers. Each one of you, doubtless, has his favorite system of cultivation, and we cannot expect you to abandon it without due reflection and careful thought. It must be expected that active, progressive farmers will differ. Hence, we are here to compare our respective processes, and to learn each other's methods.

I am confident that should the manner of cultivation I have but imperfectly outlined be generally adopted by the farmers of Michigan, our present low average of but little over 30 bushels per acre would soon become a thing of the past, and instead thereof we should reap, some sixty, some eighty, and some even an hundred fold.

DISCUSSION.

John Irwin.—Is it not better to plow early and let the ground get warm before planting?

Mr. Sparks.—In general, no. The ground should be fresh as possible from the plow; of course it should be in good condition. Quick germination and rapid growth are the conditions of successful corn growing.

John Irwin.—He did not believe it would do to plant immediately after plowing on clay; it might be good on sand.

John Clark.—He agreed with Mr. Irwin, and could raise much better corn from fall plowing. He believed in fresh soil and he obtained this by cultivating the plowed land. He believed in raising large crops of corn and grass as necessary to the existence of live stock, from which we maintain our fertility.

Mr. ——— did not agree with Mr. Sparks as to the depth of planting; would not plant deep on a dry soil.

John Young wanted to know what was meant by food for the corn.

Mr. Sparks.—Do not wish to go into the subject of artificial fertilizers. I wished to show that nature provided a fertilizer.

Mr. Nims wanted to know if fall plowing did not rob the soil of the blanket which protects it from the frost.

Mr. Sparks did not believe in fall plowing as a general thing, except it might be for a stiff timothy sod.

Mr. Irwin mentioned an instance where he obtained good results from fall plowing.

Mr. John Clark wanted to know of the use of the harrow, either just before or just after the corn comes up.

Mr. Irwin.—I have obtained good results with a harrow, better than from a cultivator.

Mr. Clark said he had bought a harrow made on purpose for working corn. The angle at which the teeth meet the frame can be changed.

Mr. Baker.—I have used a common harrow after the corn was up four inches; did not take out more than one or two hills in forty rods. Ground is a sandy loam. I roll it every year; that is a good plan.

Mr. Nims.—Does it not hurt corn worse to harrow when it is one inch high than when four inches high?

Mr. Woodruff thought that a fact. He believed firmly in thoroughly harrowing the corn just before it comes up and after it is about four inches high.

Mr. Dorrity.—I put the drag on just before it comes up, and I also cross-drag it. I have good corn invariably.

Mr. B. Helmic.—I plant corn the first day of May if the ground is fit. I would use a marker, and prefer my corn near the top of the ground. I would not have it four or five inches down. I believe in fall plowing; it destroys the weeds and the worms. Last year the early planted corn was better than the late, and I believe that to be a general truth every year.

Mr. Grey.—Thought that 50 years ago corn was raised without much effort. The squaws raised corn by pulling up the hazel brush. Our soil was better then than it will ever be again. Our soils are not as good as they were formerly, and they never can be in that condition.

Mr. Sparks.—Said he agreed with Mr. Helmic when his proviso was in full force in regard to the condition of the soil. I would plant any time when the soil is in good condition. Now it is not a fact that our soil is deteriorating, every novice knows that he can raise more on an old field than on a new field.

F. R. Harding.—Did not believe in the double shovel plow any more than in the cultivator. We could raise as much corn to the acre with a cultivator.

Mr. Glytton.—Did not agree with Mr. Sparks in regard to the number of kernels to the hill, neither as to the distance apart of the hills. I do not believe in the old rhyme—

"One for the black bird,
One for the crow,
One to get mouldy
And one to grow."

I would plant 3 kernels in a hill, but I would first test these to be sure they would grow. I stated a calculation that showed that an increase of size of the ears one-fifth, made a great difference in the yield of a field. He would rather have the hills farther apart than four feet, than nearer.

Mr. Clark thought that the number of kernels in a hill depended upon the richness of the soil; said he believed that the reason corn was not as good a crop as formerly was the fact that corn was not as well cultivated.

W. Hamilton said he obtained a yield of 40 bushels of corn per acre, with three kernels in a hill; the next year, on the same field, he planted his corn four feet apart, two kernels in a hill, and he obtained 50 bushels per acre. He manured his field well before his first crop.

Mr. Helmic thought he would not plant less than three kernels in a hill under any condition. He thought Mr. Hamilton obtained a larger yield the second year more because of the effect of the manure than because of the diminished amount of seed.

Mr. J. Bedger would like to know how corn was planted, with a machine or by hand. I plant by a machine, about 1½ inch deep. I consider two kernels to the hill sufficient. I have used a machine for the past 15 years, and have uniformly secured good results.

Mr. Glytton.—I have planted with a machine, and with boys; now I plant by men, and have better crops now than ever before. I never used a horse corn planter.

Mr. J. Bedger.—I plant with a horse power machine. I have used a harrow with success when the corn was small.

Mr. Gray said he offered to pick out, with a neighbor, 50 hills containing two stalks, his neighbor to pick out 50 hills containing five stalks each, and the man who could make the best showing from these hills was to have the corn crop of both fields. His neighbor would not accept.

Mr. Rogers would like to know about the influence of forests. I believe that formerly they did much to influence the climate, and consequently the corn crop.

Mr. Gillitte wanted to know in regard to plowing blue grass sod for corn; also in regard to late cultivating.

Mr. Clark believed in plowing blue grass sod in the fall, and in late cultivating.

Mr. Sparks did not intend to convey the impression that five grains should be grown in a hill; three kernels in a hill is, under all circumstances, sufficient. He believed in planting five kernels and in thinning out to three kernels. He knew that some soil would not grow three stalks in each hill, some not two, and some not one. He would plant his corn in relation to the capacity of his soil.

TUESDAY EVENING SESSION

was devoted to a discussion of the methods of operating

AGRICULTURAL FAIRS.

On motion, Mr. Wm. Chamberlain of Three Oakes was called to the chair. He believed that fairs were in general of much benefit, bringing the people into connection with each other, and giving them an opportunity of seeing improved stock. I believe, however, that of late years we have fallen into ruts, and I think that our practice can be improved. I believe in having the fairs move from one locality to another, as giving a greater attendance, and an improved state of finances. He did not think it necessary to have an expensive horse track and large fair ground. Horse races and horse fairs can be separate. The State fair has adopted the policy of moving from one locality to another, and with good effect. I believe it would be good policy to allow sales of animals, and let it be understood that these animals shall be sold.

Mr. Davis of Niles, President of the Berrien Co. Agricultural Society.—Having had some experience with conducting of fairs, I feel that the keynote was struck in the previous remarks. Now it is to be understood that the fair is what the people make it. The officers of the agricultural society want to carry out the wishes of the people. Our society is badly in debt, having purchased a ground at Niles. Before these grounds were purchased it was our policy to change the localities.

Mr. Higbee of Benton Harbor, President of the Northern Agricultural Society.—A number of years ago a fair was started at St. Joseph, which soon got into difficulty, and it was finally given up. The members were individually liable, and I had to pay about $150. A fair was next started at Benton Harbor and I became connected with it. We have a ground with a half mile track. I believe in fast horses; it is not they that hurt us, but it is the men that attend to the races. I believe that fast horses are durable horses, and grand horses. We could not possibly run a fair without horse trotting. We could not possibly get an audience.

Mr. Davis.—Said that although there were many fairs in the vicinity, there should be no feeling that there is any closing. We are all working together.

Thomas Mars.—I have a plan for a successful fair. I had hoped to have heard from others. I have been connected with the Niles fair for over 17 years. In spite of good management the idea is made current by dissatisfied parties, that the individual, not the article, gets the premium. If every individual will make up his mind to attend the fair, to go there and put on exhibition some article, make up his mind not to show for a premium, but for the benefit of the whole.

Mr. Glydden, of Paw Paw.—The fair at Paw Paw has a good reputation. The board of the fair has been for years a permanent one. He believed that fairs would stimulate agriculture. He did not believe in horse trots.

Mr. Sparks.—Thought that the primary object of an agricultural fair had been lost sight of. If I am correct the fair should be made to include all objects of interest to the farmer. It should show the progress in the mechanic arts and in agriculture. Now, the fact is, that our fairs are all horse, a few pumpkins—perhaps two, a few apples. I do not believe the race horse to be of any value to a farmer (especially if he has boys.) Now I believe a strictly agricultural fair would be a success. If the race horse that is not worth two coppers for any one else or for anything else were excluded.

Mr. Mars.—Was sure that the fair could not be made a success without a horse race.

Mr. Helmic.—Said that he thought that the value of the horse race to the fair was exaggerated. The premiums for speed are much too great.

FORENOON SESSION.

The session was opened by Dr. J. M. Roe, who read the following paper on

FRUIT ON THE FARM.

"Fruit on the Farm," the subject assigned me for investigation, is rather an extensive theme for one essay, and especially by one not accustomed to writing on that subject, or in fact anything else relating to farming. But having some knowledge of one branch of the subject, both theoretical and practical, I shall confine myself mainly to the orchard, or apples on the farm.

Apples, like all other farm products, cannot be grown successfully without work; and the work, even more than in other branches of agriculture, should be guided by knowledge. An apple tree is not like a weed; it will not grow and bring its fruit to perfection without care or attention. I believe the work should commence before the tree begins its life, in the selection of the seeds which produce the roots for grafting. I believe the root affects, to some extent at least, the quality of the fruit. I am sure it affects the quality and growth of the tree. There is probably as much difference in the manner of growth and general outline of the underground part of a tree as of the part above ground. The manner in which seeds are obtained for growing roots for grafting is about the worst imaginable. They are all, or nearly all, obtained from cider makers. They are the seeds of the poorest varieties of apples and the poorest quality of their class. The unripe, windfalls, wormy, rotten, scabby, ill-shaped apples are mostly used for making cider, and the seeds of which are used for raising seedlings for grafting. A better plan, I think, would be to save the seeds of the best varieties from the most perfect trees, and the best apples of these varieties and trees.

And the work of growing trees for the orchard should be commenced by the nurseryman as soon as the graft commences to grow. Even before the grafting is done care should be used not only in selecting the scions, but also the roots.

The root should not be used too close to the crown or collar, as it is there better supplied with dormant buds than in any other part, and will cause the tree to sprout more than if the lower part of the root had been used. The work of the nurseryman in cultivating, trimming and sprouting should be carefully and faithfully done till the trees are transferred from the nursery to the orchard. The size of an orchard, or the number of trees of which it is composed, should be a very important question with the farmer. It should always be large enough to pay for cultivating, but never so large as to be neglected for want of time to cultivate it, or to occupy more land than can be spared from other uses. I think this is one great source of failure of orchards on the farm—they are too large. They either get no cultivation at all or the land must be used for general farming purposes while trying to raise apples. Both cannot be successfully done. The orchard on the farm is more frequently used for pasture than for anything else; but this I think is bad policy, especially when pastured with horses and cattle. Some farmers depend mainly on their stock for trimming their orchards. It is needless to say it is not very well done; and yet I think it is done nearly as well as some professional pruners do it. A great many orchards are nearly ruined by bad pruning. The great object with some seems to be to cut off all the lower limbs, and when followed up for a number of years leaves the tree almost useless for the purpose of bearing fruit, and what little it does bear costs about all it is worth to pick it.

There are two principal objects, I think, to be kept in view in trimming trees: first, to keep the top properly thinned out to admit sunshine and air; and, second, to keep the tree from growing too high. In regard to the enemies of fruit, and especially of apples, I shall speak of only those which have been the greatest pests in my own orchard. First in order comes the apple-tree borer, which mainly affects young trees which are not healthy or have been injured by hard winters. The egg is laid in June, and generally on the south or southwest side of the tree where the bark is dead or dying, and soon hatches and commences its ravages. The first year it eats its way between the bark and wood, eating mostly the new growth of wood. The second year it enlarges its burrows till it attains its full growth, when it eats its way into the tree, boring a hole two or three inches in length, and thus frequently ruining the tree. It reaches its perfect state, and comes out a small, bluish shiny bug, the last of May or first of June, ready to deposit its eggs and begin its course of destruction anew.

As prevention is always better than cure, and sometimes more easily applied, the application of a thick wash or paste of lime or soap to the body and lower limbs of the tree will prevent the deposit of eggs, and, of course, there will be no worms. But if this is not done, and the worms hatch out, then the knife is the best remedy, and it can be used so as not to materially injure the tree, and still remove most of the worms. After the worms bore into the tree a piece of wire is the best thing to hunt them with; or, if not readily found, then fill their hole with putty, and as the bugs cannot eat their way out they must die.

The next enemy I notice is the tent caterpillar, consisting of two broods, or varieties, I am not sure which. The first brood comes early in the spring, before the leaves are out. They hatch from eggs laid in the fall in bands or cylinders around the small branches. As soon as they hatch they crawl to the base of the limb on which they hatch and there make their tent or nest. They eat the leaves and blossoms as fast as they grow. They can be readily destroyed, either before or soon after hatching; more easily found after hatching by their white shiny nest. The second brood or variety makes its appearance about the middle of summer, and makes its tent or nest on the branches and leaves where it feeds. It eats clean the pulp of the leaves, and leaves them dry and dead, covered with their tents or nests. They don't seem to be very particular what kind of leaves they eat as they seem to do equally well on apple, cherry, hickory, walnut, or oak. The sooner after hatching they are seen and destroyed, the better, and every nest, whether on apple or other tree, should be destroyed.

But of all the pests in the orchard with which farmers have to contend, and the one most difficult to overcome, is the apple worm or codling moth. It is a night worker and hates the light. It is hard to find until the mischief is done and the apples ruined. It makes its appearance about the first of June, or when apples attain the size of grapes. It may be seen about twilight on warm evenings in the tops of the apple trees, flying close above and around the branches, and darting in and out among the leaves. Soon after this the eggs are laid, generally in the calyx or blossom of the apple, sometimes on the side of the apple, which is generally ruined and drops off. The worms mature in about three weeks in warm weather and leave the apples and crawl down the limbs of the tree to find a hiding place in which to undergo their transformations. In a week or two they attain their perfect or moth state ready to deposit their eggs and thus begin anew their depredations. This process continues all summer and fall, the last worms either being gathered with the apples or finding a hiding place and passing the winter in the pupa or dormant state. They do however sometimes pass the winter in the worm or larva state, as I have seen them in the spring. No good remedy for the codling moth is yet known. It has been recommended to keep hogs in the orchard during the summer and fall to eat the worms in the fallen apples. But unfortunately the worms generally leave the apple before it falls. I think not more than one apple in ten falls with the worm in it, and that is an accident which the worm did not intend. It may pay to keep hogs in the orchard, but not as a remedy against the codling moth. The best remedy known is to furnish the worms a good hiding place on the body of the tree and fight it out on that line all summer. They should be looked after and killed once a week till the apples are picked. If a poison could be discovered that would kill the worms on coming in contact with it it would be of immense benefit to farmers. By scraping off the rough bark of the trees and thus destroying their hiding places, and then furnishing a better hiding place, it is possible to induce most of the offending tribe to crawl into the trap. If now by having the paper band, or whatever might be used, poisoned so that to enter the trap would be certain death, the battle would be won.

DISCUSSION.

Mr. Brown, of Stevensville, wished to know if decayed wood did not invite the attack of the apple tree borer?

Dr. Roe.—The borer does not live on dead wood, although they kill it.

John Irwin said he believed in pasturing an orchard. He has had his orchard seeded ever since 1860, and he was willing to compare his fruit with that of any one. When I kept hogs in my orchard I found no wormy apples. But when I took the hogs out the apples got wormy. I would trim the trees from the outside towards the inside, so that air, but no light, can get to the inside of the tree. I would have my lowest branches about five feet high. I do not believe in the work of professional trimmers.

Mr. Brown, of Stevensville, said he was much interested in regard to the codling moth. He said that woolen cloth for bands was much better than paper. After the first brood the successive broods are not migratory, as has been proved from the fact that of two orchards side by side, the one in which the trees were banded was not at all injured, whereas the other was nearly destroyed.

Question in Box.—Can the bearing year of apples be changed?

Dr. Roe.—I am unable to answer that question.

Mr. John Irwin thought the reason to be that a tree bears one year too full and consequently does not have strength to bear the next year. He believed in a judicious picking of the fruit off from some branches, and would pick the apples when quite small. He did not speak from experience.

Mr. Glydden wanted to know of Prof. Cook if it were true that there were two kinds of tent caterpillers?

Prof. Cook said too much stress could not be put on the use of concerted action in fighting insects. He believed that hogs were of some value in fighting the codling moth, and he is quite sure that the hogs catch one-half of the codling moths. If the birds are not killed they will take a good portion of the other half. Bands of woolen or paper lined with cotton are better than paper alone. These bands should be removed in hot weather once in 8 days, in cold weather once in 10 days. The best way to get rid of this moth is to hire a boy to tend to all the orchards in the neighborhood.

Mr. Clark.—What time should these bands be put on?

Prof. Cook.—They should be put on and examined by July 5th.

Dr. Roe said he had not much experience with hogs in an orchard, but he had examined quite extensively the apples that fall. He did not find more than one in ten falls off. He said that Paris green would not affect the apples.

Mr. Irwin said he believed the doctor was mistaken, for he found the apples that fall to the ground to be generally full of moths, and that these apples if put into the cellar, would send forth full fledged codling moths.

Mr. Glydden said that he did not object to seeds of common apples, as it is well known the common crab is a very tough tree. Our very best seed comes from our natural fruit; our grafted fruit does not furnish plump seed. The character of the fruit is not affected by the seed or root.

Mr. Brown cited some experiments that showed that the stock did influence the character of the fruit, especially with reference to the Baldwin apple.

Chas. F. Howe read the following paper on

WHEAT CULTURE.

Mr. President, Ladies and Gentlemen:—To me has been assigned the duty of presenting for your consideration a few thoughts on "Wheat Culture."

I should hesitate long before undertaking this task, did I not know that this audience will not allow any erroneous ideas that I may advance to pass without your corrections.

It seems to me that the culture of wheat is one of more importance to the people of this part of the State than any other crop raised by the farmer.

The crop of corn must be used, not only for the purpose of keeping the stock on the farm through our northern winters, but a plentiful supply must be stored, that the teams for labor on the farm may be kept in that condition that all good farmers like to see, who desire the labor of the long summer days, carried forward to a successful termination. The surplus, if any, goes to market in small quantities, and coming as it does by littles, and going the same, we do not attach to it the importance it deserves. The oat crop is of great benefit to the farmer for use on the farm, yet it does not bring directly much money into the farmer's treasury. Tho return from the apple crop and from the sale of swine, come in good time for the paying of our taxes, and for protecting our families from the chilling blasts of winter.

The sale of our wool prepares the farmer's treasury for the heavy drafts thereon, made necessary by the employment of extra labor in securing the harvest. Thus you see that all these crops are of great importance to the farmer and come to him in his time of need, leaving the income from the sale of wheat to pay the annual payment for the farm, for ventures in some new directions, or for removing from the farmer's home (if ought ever does remove it) that detestable modern improvement, the mortgage.

I might describe to you what I would call a desirable soil for the successful cultivation of wheat, and yet in a country like this, where the soil is so variable, where the heavy and light soil are in close proximity, where the rich and poor land lay almost side by side, it would not be advisable to do so, but rather give you my views of the way *any* land should be worked to bring to the tiller of the soil the best results for their labor.

Let us consider for a few moments the plowing of a field for wheat. If I were not familiar with the field I would first make a careful examination of the same. If I found the previous management had thrown the furrows towards the fence until the field looked like a miniature fortification, I should lay my plans to turn the furrows away from the fence. If I found upon examination that the cultivator of the previous year had made war with the briars and thistles growing upon these same fortifications, and that the briars had gained the victory, the first thing to do would be to fight that battle over again, and fight for extermination. It is presumable that the plowman has good reasons for doing so when he begins to plow a field at the side next the gate, and yet I have often seen men begin a field in this way when there was no apparent reason for doing so, making it necessary to cross the plowed ground in going to and from the plow. This is not the best way for the convenience of plowman or team, neither is it best for a field that is pastured while plowing, as the stock will do considerable damage to the land around the gate, especially if they travel over the ground when wet. A good plowman and a progressive farmer will have the best plow made. He will not be satisfied with somebody's plow sold at auction for a dollar—nearly as good as new—simply because the owner considered it too poor to wear out.

It is *not* economy to use a poor plow because you have bought it and want to wear it out before you buy another; neither is it economy to use a good plow, one moment after it ceases to do good work, for want of a new point or any other repairs. In plowing a field all the land should be turned over, all stubble or growing vegetation should be turned under out of sight.

I do not recommend plowing extremely deep for wheat; and yet, if the previous plowing had turned under manure, or vegetable matter, I should plow deep enough to turn it up again.

Presuming that you have a plowman that understands his business, and that he is supplied with team and tools, suitable for good work, let us consider the best time to plow for wheat. Corn stubble ground I would recommend to be plowed the last of June, or any time before the beginning of wheat harvest.

Clover fields not needed for pasture, I would plow about the same time, and if the field was somewhat run down, I would turn under a full crop of clover, using plaster if necessary to stimulate the growth of clover.

As many farmers sow wheat after wheat, and wheat after oats, I would say the sooner such fields are plowed, after the crops are removed, the better will be the return for the farmer's labor. I cannot let this opportunity pass without trying to impress upon your minds the great benefit to be derived from early plowing. Oft-times have I seen some thrifty farmer take advantage of a wet day in the midst of harvest to start the plow, laying out his work, and perhaps plowing a few rods in width, that he may have a good beginning when his harvest is over. And I have always noticed the difference between the growth of wheat on this early plowing, and that plowed much later; that on the early-plowed land coming up the strongest, covering the ground before the other does, and sometimes the difference is so marked that you can tell the early-plowed land up to harvest, and even after harvest the stubble will show that the largest wheat grew on the early-plowed land.

I would advise that land plowed in June be left just as the plow leaves it, until after harvest, unless there are indications that there will be too large a growth of vegetation before that time; in that case the farmer must find time to harrow thoroughly, and then give sufficient surface cultivation after that to check all vegetation up to the time of sowing.

Land plowed after harvest, I think, should be thoroughly harrowed as soon as plowed. Some farmers who have good success in raising wheat, harrow each day's plowing the same day it is plowed. This course seems to be best, because any seeds that may be in the ground will grow so much quicker on ground that is harrowed, and it is desirable that such seeds should grow, and that they may be killed in their infancy by frequent cultivation.

The reason that I do not recommend harrowing land plowed before harvest, as soon as it is plowed, is this: it stimulates the growth of seeds, and makes cultivation necessary at a time of year when the farmer needs all the time of men and teams in securing the harvest. On the other hand, if the ground is left rough, and the season favorable, the fallow does not require any work from the farmer until such time as he can give it his undivided attention. Land plowed early has the power to retain moisture, and will retain moisture sufficient to germinate seeds, when land plowed later is dry furrow deep; to illustrate this, I would say that a field plowed early, and given the necessary cultivation, was examined the middle of August last year, and moisture was found within one inch of the surface sufficient to grow wheat. At this time we were in the midst of a severe drought, so much so that many farmers had to stop their plowing on clover sod and pasture land.

Having our land properly prepared for the seed, let us consider the time of sowing. There are so many circumstances that have a bearing on this subject that I hardly know where to begin, or what to say. If we fear the Hessian fly we sow later than we would if we had no such fears. If we anticipate a short, cold autumn and an early winter, we like to sow early, that our crop may get sufficient growth to withstand severe winter weather. I have seen wheat sown the last of September that did not grow enough to scarcely make the ground look green; again, look at last season, wheat sown the last of September grew as large by the beginning of winter as any farmer would like to see.

To those farmers who have eight or ten days seeding, I would say begin the first of September and sow as fast as you can until done, which, in my own case, I would not like to be later than the 20th of the month. To those who do not have so much seeding, I would advise sowing one day, or one field, early in September; after waiting a few days sow another day or field. I advise this because sometimes the early, and sometimes the late, seeding yields the best; again, for the convenience of harvesting, it is well to have a field ready for the sickle in advance of the balance of the harvest.

I sow my wheat with a force feed tooth drill, eight inches between the drills. This I consider the best way to sow wheat, taking one year with another. Some years broadcast seeding may be as good, or even better than that sown with the drill; then, again, when we have severe winter weather, with frequent freezing and thawing, the position of drill-sown wheat is such—being in the depressions between the ridges—that freezing and thawing tends to cover the roots deeper, instead of leaving them bare. I do not think wheat should be sown very deep, one inch has been recommended as deep enough for corn, unless in time of drouth, and why should wheat, which is a much smaller kernel, be planted any deeper than corn? I am always satisfied when seeding if the seed is all deposited out of sight. I have sown two bushels of wheat to the acre, and as low as one bushel to the acre. I think one bushel is preferable to two; of late years I sow a trifle over one bushel to the acre early in the season, and increase the quantity slightly later in the season.

I endeavor to select my seed from a field that is well matured, and as free from foul seeds as possible. I prefer that the grain stand in the stack until near the time of seeding, as I think much seed is injured by being threshed from the shock and placed in large bins where it will heat, thus destroying its power of germination. This I think is one of the reasons why we hear complaints of a poor stand of wheat, from heavy seeding.

I wish here to say a discouraging word to those farmers, who sow their wheat as it comes from the thresher; although it may appear comparatively clean, there is danger that small seeds may be concealed, that if once sown may cause the farmer years of toil and trouble. I have found the seeds of cockle the most objectionable of any foul seeds when I go to market, and the most troublesome to separate from seed wheat. Chess is another seed that is not a very desirable mixture for our seed wheat; it is much easier to separate from seed wheat than cockle, and I advise my brother farmers to use due diligence, that none be sown, as it might fail to turn to wheat.

Smut is objectionable in seed wheat, although I have never found that it had any effect on the growing crop; sometimes when smut has been sown, the following crop has been free from smut, and vice versa.

Having our crop sown it requires but little attention from the farmer until it is ready for the sickle, therefore we will pass over this interval of time, and consider for a few moments this part of our subject. Perhaps I cannot do better here, than give you a little of my last year's experience, thinking it will be more satisfactory to you than any theories that I might advance.

I had a field of wheat on soil suitable for the early ripening of wheat. One corner of this field of about four acres, was once a black ash swamp, the soil was black and cold, consequently, when the majority of this field was ready for harvesting the low land was very green; it would not be amiss to say, it was as "green as grass." At first we thought it would be best to leave this part of the field until the balance of the harvest was cut; but, as the field was some distance from home, it was desirable to make a clean sweep of the field, and we did so.

This field was the first harvested, and as the wheat was very well shocked, it was left until the last to stack. When this wheat was stacked, it was noticed that the wheat cut on the low ground was considerably shrunken, and it was decided that we had made a mistake in cutting this wheat so green.

At threshing time it was noticed that the wheat cut green was the plumpest and handsomest wheat in the field; it was also lighter in color, showing that it had a thin bran.

This satisfies me that if you are reasonably sure of good weather, and intend to let your wheat go through the sweating process in the stack, you can cut your wheat from two to four days earlier than most farmers do. I am also satisfied that there is certain elements in the straw, especially if cut green, that will enter into the kernel, while going through the sweating process, making a desirable quality of wheat for the miller; and that would be entirely lost, had this same wheat been threshed from the shock, as many do.

There is such a variety of machinery for the harvesting of our small grains, that it will be impossible for me, in the limits of this paper, to more than mention them; leaving the merits or demerits of each machine for the farmer's own consideration. The cradle is the oldest implement for the harvesting of grain, within the memory of your essayist; this tool is not quite out of date, but its usefulness is growing less and less, each year. A few of the old "man-killers" yet remain in use, where the grain is delivered in gavels by hand. There is no end to the variety of droppers, and self rakes, also harvesters and self-binding harvesters. As I have said before, the limits of this paper will not allow me to discuss the merits or demerits of these machines, therefore I leave the subject with this remark: the handsomest harvesting, the cleanest harvesting, and the harvesting that was most satisfactory to men, women, and children, was done with a self-binding harvester.

Having followed our wheat crop from the fallow field to its harvesting, let us consider some of the operations of threshing, stacking, etc., that do not tend to make A No. 1 quality of wheat for market.

First in regard to the practice of threshing from the field without stacking. This I consider a bad practice. It is said by good authority that wheat must go through a sweating process, and nowhere can this be as well done as in the stack. If wheat is threshed before it goes through this process, it will sweat and heat in the bin; and if it is ground before going through this process, it will sweat in the flour, causing it to sour and spoil. Again in the time of threshing, threshers are always in a hurry, and in case of rain they usually want to begin threshing as soon as the sun comes out, and the result is that the farmer has a quantity of wet wheat on his hands that no amount of labor will make into No. 1 wheat. A large amount of wheat is sometimes injured by improper stacking, and so far as I am at present informed, the most of this has been in what the farmer calls ricks—a stack whose length equals twice its width, perhaps more. These ricks are more difficult to build than a round stack; this you will see if you give the subject a moment's attention. A sheaf of wheat is larger at the buts of the sheaf than it is at the heads, therefore in building a round stack, you lay your sheaves in a continuous circle, drawing the heads of each sheaf back sufficient to make the sheaves lay close together, or even overlap the sheaf that precedes it. In building ricks it is different; in laying along the sides of a rick the sheaves are laid straight, instead of on a circle, therefore, when the buts of the sheaves lay close together, there must be a space between the heads of the sheaves, that allows the driving storm to beat in, causing leaks and damaging more or less grain. I have seen many ricks built lengthwise east and west. A moment's thought ought to tell any one that the north side of a rick built in this way would not receive the necessary sunshine to dry out the driving storm. Experienced stackers can build ricks and insure the saving of the grain; none other should attempt to do so. Some build round stacks that wet from top to bottom.

It seems to me that the farmer cannot afford at this time—when nearly all the hard labor is done to secure the crop—to allow his work to be so poorly done, or so hastily done, that it materially injures the quality and market price of the crop. I could name to you, if I thought best to do so, several farmers that had from three to seven hundred bushels of wet wheat last fall, although it was not considered a bad season for the saving of grain in the stack.

Every farmer should have enough storage room for his crop of wheat. A separate building for this purpose would be the best, as it could be made nearly rat and mice proof, and the danger from fire would be so much less in a separate building than it would be in a barn that contained hay, stables, etc. Every farmer having sufficient storage room on the farm should store his wheat unless the price suits him at threshing time.

Some farmers store in mills and in depots. This I consider a very bad practice. Wheat stored in a mill will sometimes bring a higher price in a depot or in some other mill, and wheat stored in a depot very often will pay better to sell in the home market than it will to ship. Wheat stored is at the mercy of one man, or one market, while if his wheat was in his own granary he could take advantage of all the markets, and sometimes of the markets of several villages. In regard to the time to market wheat, I would say that I think this is a matter that every farmer should decide for himself. I do think it my duty to urge farmers to so arrange their finances that it will not be necessary to thresh and put in market their wheat, or any part of it, until the price suits them. It has been said, and I think with a great deal of truth, that a certain portion of the wheat crop will go into market as soon as it can be put there after harvest, let the price be what it may. What I urge upon you is to so situate yourselves that this will not be compulsory.

Through the kindness of the editor of the Berrien County Record I have been enabled to give you the price of wheat as quoted in that paper for the months of May and August for the past twelve years. As statistics are not considered very entertaining I will not weary you with their reading, merely giving you the average for the twelve years:

Price per bu. in August.	Year.	Price per bu. in May.
$2.10	1868	$2.70
1.15	1869	1.50
1.15	1870	1.25
1.00	1871	1.35
1.30	1872	1.90
1.40	1873	1.70
1.15	1874	1.50
1.25	1875	1.25
1.00	1876	1.20
1.10	1877	2.05
.80	1878	1.15
.90	1879	1.00
	1880	1.35
12)$14.30		13)$19.90
$1.19 average.		$1.53 av'ge.

Difference of 34 cents.

Brother farmers, we have already followed our subject a step beyond, perhaps, where "wheat culture ends," therefore we leave the subject in your hands for further consideration.

DISCUSSION.

Mr. Clark wanted to know if the process of early plowing does not tend to impoverish the soil.

Mr. Howe.—Our practice has been to plow in June, and we raise better crops now than ever before.

Mr. Sparks.—Do you allow any weeds to grow on your fallow?

Mr. Howe.—He had tried both ways, but had found it better to keep down the weeds.

Mr, Sparks had found the late plowed land more moist than that plowed early, and his wheat much better. The last plowing was the last week in June.

Mr. Howe said he considered that plowing the last week in June was sufficiently early.

Mr. Clark asked what was thought of plowing under a rank growth of buckwheat.

Mr. Woodruff had obtained better results from plowing under sowed corn.

Mr. Mead had tried buckwheat with no visible results.

Mr. D. Crawford would ask Mr. Howe if he had dragged his wheat after it was up.

Mr. Howe said he often dragged his wheat; he considered it of no harm; thought it did good.

Mr. B. Pennell asked if twice plowing was not a good thing for wheat.

Mr. Howe did not believe in twice plowing.

Mr. Morgan.—What is the effect of pasturing wheat in the fall?

Mr. Howe.—When my wheat gets too large I usually pasture,—unless the ground is too wet I used horses or cattle; when wet, sheep.

Mr. Herkimer.—Would not sheep kill out the Hessian fly?

Mr. Howe.—That question has been answered that pasturing will not kill the fly.

Mr. Thompson.—It is necessary to plow a second time on some soils in order to keep down the weeds.

Mr. Howe.—I do not recommend such early plowing as to give weeds a chance.

Mr. Fox mentioned a case where summer fallow had been abandoned.

Mr. Glydden said he agreed with the essayist as to the amount of seed per acre.

Mr. Cole.—I believe with the essayist.

Mr. Sparks.—I drilled in 1¼ bushels per acre, and I am content.

Mr. Glydden said in the Fultz wheat are 6,180 kernels per bushel, and in Clawson 5,145, this would give 14 or 15 grains for each square foot if a bushel per acre be sowed.

Mr. Howe did not believe in raising wheat after wheat.

AFTERNOON SESSION.

Prof. Samuel Johnson of the Agricultural College read a paper on "Stock," of which we have not the manuscript.

Mr. J. H. Gillette read the following paper on

"FARM FERTILIZERS."

In considering the sources from whence the elements of plant growth come, and the manner of supplying them, we will first consider the natural means, afterwards, the artificial.

The atmosphere that encircles the earth contains some of the ingredients essential to plant growth, oxygen, nitrogen, and carbonic acid. It has been estimated that there are seven tons' weight of this latter gas over every acre of the earth's surface, and that over one-half of the carbon composing the blades of grass, the stalks of grain, and trunks of trees, comes from that source. Its presence in the atmosphere is produced by such agencies as fires, breathing of animals, and putrefaction of animal and vegetable matter. The remainder of the carbon, or less than one-half, is introduced from the soil, the roots acting as the conducting medium. But to form the stalk and leaves, the starch and sugar, there is required a union of carbon with oxygen and hydrogen. These two elements are derived largely, in fact almost wholly, from water. This liquid, as it with other substances is absorbed, becomes decomposed, enters into new combinations forming component parts. While carbon, oxygen, and hydrogen are the principal elements employed in the structure of plants, and nitrogen is not essential to their growth, it nevertheless enters into their composition and is indispensable to the development of fruits, grains, and seeds. Where does it come from? From its abundance in the atmosphere, constituting about four-fifths, it would be a natural conclusion that it is taken from the air. But unlike carbon it is but sligtly derived from that source, and is introduced from the soil. How? The chemist can find no nitrogen in the soil, but does find substances that contain it. The most abundant of these is carbonate of ammonia. This is taken into the vegetable laboratory, analyzed, and contributes to growth.

Aside from the four elements entering into a composition of the vegetable kingdom and constituting organic food, there are other substances found; such as potash, phosphorus, silica, lime, etc., these are known as inorganic food, and are not needed for growth, but are absolutely essential to a perfect development. The organic part of plants, composed of gases, is a volatile substance and upon separation from the inorganic, flies into the air. Inorganic portions may be seen in the remains of vegetable matter after decay has finished its work, and in ashes, after fire. It is estimated that ninety-eight-hundredths of the stock of our grains, and all woody substances is organic matter, and the remaining two-hundredths inorganic. In view of this fact it will need no after argument to show the folly of a practice, prevalent with some, of burning straw. While such are themselves losing the great bulk of its substance, they are, though unconsciously, public benefactors.

Prof. Liebig separates all cultivated plants into three classes, viz.: potash, lime, and silica. Potash plants are those in which potash and soda enter largely as bases. The beet, turnip, etc., are of this class. Lime plants are those in which lime and magnesia are the principal ingredients,—among such may be placed tobacco and clover. Silica plants embrace those in which silica is the prominent part in the ashes, such as wheat, rye, oats, and barley. So then, the study of the farmer is too plant his grain and sow seed in soil that contains suitable elements, and if destitute or deficient of such, it is his business to supply them. Some of these methods we will consider under the head of

Farm Fertilizers.

One of the first, both in our thought and degree of importance, is the inevitable accumulation upon every farm where stock is kept. Our stable and barn-yard manure embodies in its chemical composition a large collection of valuable ingredients, and will admit of more profitable application to a variety of crops than any other fertilizer. Properly preserved and judiciously applied, its effects are seen in the growing corn, the waving wheat, and in the verdant meadow. The more of this that can be applied, larger will be the farmer's dividends. It is a custom among our farmers, perhaps a large majority of them, to throw the cleanings from the stable into piles exposed to sun, wind, and rain. This custom, notwithstanding its universality, is a losing practice. Exposed to drenching rains, much of its substance is carried to neighboring ponds or distant swamps and is lost. That which does remain is subject to the dissipating power of the sun. Its fertilizing properties are continually growing less, rising into the air and carried by winds to other farms. Hence to retain its full value it should be protected from these wasteful agencies. The expense of such a protection would be a comparative trifle and an exceedingly profitable investment. But if this fertilizer is left exposed, I know of no better treatment than to supply in frequent and abundant quantities layers of straw with a considerable sprinkling of plaster. The straw serves as an absorbent of the liquid part, also as a covering, while the plaster decomposed unites with the carbonic acid, lime, and ammonia, forming carbonate of lime and sulphate of ammonia, non-volatile substances.

The manner of applying is an important consideration and is subject to mistaken ways. It is occasionally drawn during the winter when "there is plenty time," put into small piles, and left to daily diminish in value. It is true that during this season it can be *conveniently* drawn, but it is unwise to do so. Better expend a few extra dollars, immediately previous to plowing, in hauling and spreading, and thus utilize its whole substance. That this fertilizer is effective of good needs no argument to convince, the result of no experiment to prove. The discriminating eye of every practical farmer has seen its benefits; they are conspicuously obvious and ever convincing. In this place we would not neglect to notice the liquid part, in view of its value. In portions of England it is studiously preserved, and as habitually used as any other fertilizer, and with a paying result. Our stables and barn-yards can be easily constructed in a manner to conduct it into a cistern, from which it can be pumped into a wagon tank and with a sprinkler attachment distributed evenly over the ground. From such a practice in an experimenting case within my own observation, I can attest to its practicability and profitableness.

While these agents are efficient fertilizers, they are nevertheless insufficient, as they do not accumulate in quantities to supply the constant demand. This deficiency that would exist has an ample provision in clover. When we compare the cost and efficacy of clover with the fertilizers of commerce, our judgment passes at once in its favor; and when we consider that it is itself a valuable crop, which, when stored in the barn, has enriched the soil, as its roots continue to do, we denominate it *the desideratum of farm fertilizers.* Since we should be solicitous advocates of this agent. Look upon a field where it has a rank and luxurious growth. We see a grand receptacle full of *growing* elements. Bury this with the plow and we have deposited where the investment pays and dividends are sure. Upon an acre of the largest growth there is contained in the clover about 150 lbs. of inorganic substances and 80 lbs. of nitrogen, while the roots possess a large quantity of nitrogen, lime, soda, magnesia, sulphur, potash, and phosphorus, which serve as nutriment for the three classes of cultivated plants. The variety of its ingredients is one of its recommending qualities. When utilized as a fertilizer for corn, experience teaches that it should be plowed under in the fall, so that this crop, which is of quicker growth than wheat, may receive the benefit. A few years since, having a clover field in which I intended to plant corn, I plowed a part of it in the fall previous to planting and left the remainder until spring to note the result of the clover as effected by the difference in time of plowing. The clover that was plowed under in the fall had become partially decayed by planting time, and the corn that was planted upon that part, from the time it first made an appearance until matured, was superior to the spring-plowed portion. Its growth was more healthy and luxuriant; its yield more abundant. And who will question its value for wheat, or estimate its worth? Cases almost innumerable exist where farms once yielding but a light crop have doubled—yes, trebled—in its production after clovering. If the straw is short and the berry diminutive, clover will give an ample growth and full kernel. Unlike most fertilizers, the influence of clover is not confined to the time when it is plowed under and directly applied, but extends through its whole existence. While growing its roots force their way down into the soil, however compact, much farther than the modern plow, collecting nitrogen and other elements and simultaneously mellowing the ground. It also protects the gaseous substances near the surface and retains them for use. There are also other plants that may be similarly employed, such as buckwheat, hungarian, millet, etc., which are of quicker growth, though of less value than clover.

While at school, in my study of chemistry, I undertook to test the value of ashes as a fertilizer. Using only home manufactured, it was necessarily on a small scale. I distributed them upon the plowed ground previous to sowing wheat where they were thoroughly mixed with the soil by means of the harrow. As was expected, the experiment proved them unquestionably valuable in increasing the yield. That which grew adjacent and had a like chance, save the one consideration, was inferior both in quantity and quality. In the spring succeeding the application the field was seeded, and that portion upon which the ashes were applied was marked by a distinguishing growth of clover. In connection with other substances, or alone, they may also be employed to promote the growth and increase the yield of corn.

In passing to notice commercial fertilizers, we observe some which indeed possess native value, but in consideration of their cost are not commendable to Berrien county farmers. Prominent among these are guano and lime. Guano is valuable in the abundance of its ammonia, while lime is chiefly a *mechanical* agent. But there are those which may be purchased and used with profit, such as bone powder and plaster. The value of the former is duly appreciated when we reflect upon its composition. The phosphate and carbonate of lime in connection with the gelatine comprise elements required in the growth of all our grains, wheat, corn, oats, etc. It is specially valuable on land that habitually grows rank straw or stock with inferior grain.

I am informed upon inquiry that it can be obtained in our county for two cents a pound, at which figure, following recommendation, it would cost about four dollars an acre. I believe there are recorded instances where its use has increased the yield of wheat five bushels to the acre; but to calculate upon four, and the present price it commands ($1.25), or less, and the farther consideration that *it serves a like purpose for at least five years,* we should not hesitate in its recommendation and use.

Finally, we come to notice gypsum, or as generally known, plaster. Singular is the manner in which it became introduced as a fertilizer upon American soil. Dr. Franklin, who had seen its influence in promoting growth of crops in Europe, strove to induce American farmers to use it, but was unsuccessful. His arguments and rehearsals of facts failing, he sowed plaster upon the side of a hill sloping toward the highway in such a manner as to form with prodigious letters, larger than Barnum employs, the words "Effects of Gypsum." Passing farmers observed the words as produced by a distinguishing growth where it was applied and immediately adopted it as a fertilizer. It grew in popular favor, and each recurring year its use has increased, until it is now more extensively used than any other commercial fertilizer. Its chief object is to form non-volatile substances by uniting with gases that would otherwise be lost.

And thus did the venerable Dr. Franklin, not only by his influence in the British Parliament for the struggling colonists; not only in his successful endeavors to secure a treaty of alliance with the French king; but also, in the introduction of the use of plaster, *confer a national favor.*

The agricultural history of Berrien county, in fact our whole State, is most satisfactory and highly flattering. Our struggles while in infancy, unlike many of our sister States, were unencouraged, our lands unlauded. But for forty years our progress has been steady and sure. By better farming and liberal fertilizing there has been an increasing yield. Our crops have never failed, and as a rich reward for our labors our barns have been filled with plenty. Who can calculate the worth of a State composed of such counties, or compute the resources of a republic comprising similar States? They are verily beyond computation. Attention and care will insure in the future, as now, an annual abundant harvest; then will improvement continue; then will our homes, as now, be homes of plenty and comfort; then will our fruits, as now, multiply the sails of commerce, and feed starving millions; then will we, having fostered education and guarded morality, *be a prosperous, intelligent, and happy people.*

DISCUSSION.

Mr. ———.—What is the value of salt as a fertilizer?

Mr. Gillette.—Salt does not enter into chemical composition; it is good in dry seasons for drawing moisture.

Mr. Fox.—When shall plaster be sowed?

Mr. Gillette.—Would sow early in spring when the ground is moist.

Mr. Clark.—Is there any loss from evaporation of manures applied to the surface? It gives the best effect.

Mr. I. H. Gillette said he thought much of the value of the manure to be lost.

Mr. Glydden said he knew the reverse of this to be true.

Mr. Butler gave an experience of winter spreading of manure where he obtained extraordinary good results.

The Institute passed resolutions of thanks to those who furnished the music and to the Professors from the Agricultural College.

Prof. Carpenter responded on behalf of the College.

MASON INSTITUTE.

This Institute, the last of the series, though not attended by as large a number as most of the others, was deemed exceedingly satisfactory and profitable by those attending it. It commenced on Thursday evening, January 29th. After the usual preliminary exercises, Mr. A. F. Wood, who presided over the Institute, gave the following

OPENING ADDRESS.

In behalf of the State Board of Agriculture we greet you. Meeting as we do for the purpose of mental and social improvement, it is our desire that this Institute may prove a credit to ourselves and the community. For a long time it had been felt that business men, especially those engaged in agriculture, knew too little of each other; the masses have been ignorant of what has been done at the Agricultural College, and the faculty was not conversant with the needs of the farmer. Consequently, in 1875 Dr. Kedzie made a proposition to hold agricultural institutes. The State board considered the matter, appointed a committee, and the result was the appointing of six institutes in various parts of the State, held in 1876. The result was so satisfactory that it has been continued and the same number held each year to the present time.

Although we were one of the first to apply it was thought they might accomplish more good at other places, as the college is located in this county; but our application this year was favorably considered, and an appointment made. I addition to these, a large number of local institutes have been held. What has been the result? It has given members of the College faculty a large acquaintance over the State, increased the popularity and growth of the College, and they have brought thousands together to hear and discuss matters pertaining to their business, thereby gaining new ideas, and stimulating and bringing into action knowledge that has lain dormant, helping the farmer and other classes to improve and realize their true position. Improvement should always be our motto. We should not be satisfied with producing ten or fifteen bushels of wheat to the acre, when by draining, care, and a little different culture, we could double that amount with but a small outlay. So with beef—some selling and worth four and five cents per pound, while others, and a large amount, not bringing more than two to three cents, and the latter oftentimes costing the most to produce. Also of wool; it costs more to support the nature of same sheep than others, while another might clip double the amount of wool on the same expense of keeping. If the above are facts, we should not be satisfied and stay at home, continuing such unsatisfactory returns, but should make ourselves familiar with the best results by studying books and periodicals, attending institutes, or any other gatherings where mind is brought in contact with mind for improvement; also by being familiar with those that make successes. Not only may we learn financially better how to manage our business, but we must improve mentally—capable of enjoying more and of being more useful. It has assisted persons to cultivate the habit of expressing their opinions and filling places of trust and honor, much to the benefit of the world, that otherwise would have been filled by professional men not suitable to look after the majority of wants. I have only to refer you to our legislative halls, where they are largely filled with professional men. This is due mainly to the farmers themselves, for when one of their number is selected, popularity is considered and oftentimes the power of clearly and concisely putting thoughts together in words or on paper is out of their line, and the most they can do is to fill the chair and vote with the party. The result is largely a failure. If it was in human power to be experts in the different callings and know the necessity of all, we would ask for nothing more than the present plan; but as each is interested in his own particular branch, what we ask is for the farmer to realize the want, and cultivate the expression of thought, as well as the soil. Persistent effort will assist in overcoming the deficiency; and if a person is interested, the complete success of any undertaking is of the utmost importance to that individual, and every obstacle surmounted is one step higher.

In greeting the members present of the faculty of the College, those from abroad and the citizens of our own county, we welcome you all, and hope that you may feel at home, be free to ask questions, and express your views on any subjects that may come up for discussion; and to the ladies in particular, you are welcome. It is by your effort and encouragement that many of us are what we are, and your presence will aid us the more. May the time not be far off when preparations may be made so that our daughters may share an equal chance in the land grant and other appropriations at the Agricultural College.

With the exception of a poem entitled "Time's Changes," by Miss E. M. Gunnison, the other papers on the programme for the first evening session were not forthcoming, but a somewhat extended discussion was had on the subject of "Agricultural Societies." A paper had been expected on this subject from Mr. Ben. B. Baker, Secretary of the Central Michigan Agricultural Society.

FRIDAY FORENOON SESSION

was opened with a paper from Mr. F. A. Gulley, foreman of the Horticultural Department of the Agricultural College, on "Farm Economy." (See lectures given at more than one Institute.)

Miss Nettie B. Wood, of Mason, read an essay on

CIRCUMSTANCES.

The writer set forth the idea that a strong will was needful in order that we might not be the creatures but the masters of circumstances; that the weak are apt to become discouraged and allow circumstances to control them. In applying the subject to farmers and their work the writer said: The farmer has much with which to contend, and what he earns is largely due to the sweat of his brow. Proper planning and arranging the work may lighten the labor of execution, but work and hard work must be done ere it is completed. Why not? Work is the engine that draws the car of success. Command of one's self and of many surrounding circumstances is indispensable. If misfortune overtakes you, do not despair; if crops fail for some reason beyond your control, try again, but if the failure was due to yourself, allow experience to assert her supremacy and improve over the manner and time of previously performing the operation; if your home surroundings are not as pleasant as they ought to be, improve them. I think that there is not a farmer's home without a chance for improvement, but defects in some are more noticeable than in others. Provided you have the will, much can be accomplished in the odd spells, and the employment of these tell upon the completion of necessary work as well as upon reputation. One who is shifting with the circumstances will betake himself the first opportunity to the nearest town and help make a crowd at the street-corners, or will go to a neighbor's and there waste both his own and their time. Wishing to obtain local news, he will not be on the lookout to gather the grains of knowledge that would assist in making his life useful and his business a success. Some people seem to never profit by experience; others will not learn by precept, but insist on being a pupil in the school, and after carelessly, yes recklessly, going forward, they see their folly and pronounce experience a dear teacher.

Matthews tells us that experience is of two kinds: "That gained from books is learning, that from actual life is wisdom." Knowledge gained from books is beneficial only as it assists in the discipline of the mind and works in harmony with the hands. Wisdom covers judgment, discretion, skill, and dexterity, and is learned by contact with the world.

Such intercourse sharpens the perceptive faculties and drives away the thought that your ills are worse than those of any other human being. Those who look upon the bright side of life will seek and find the many pleasures that result from a contented mind.

No one is surrounded by the works of nature to the extent of the farmer. His eyes can behold the sky above with the varied and changeable clouds, the earth beneath with its hill and dale and ever babbling brook, and yet not realize the beauties until the painter and poet describe them with the brush and pen.

Hon. Wm. Ball of Hamburg, Livingston Co., read the following paper on

"HOW SHALL WE IMPROVE OUR STOCK?"

Mr. President, Fellow Farmers and Stock Growers:—In undertaking to systematically and instructively treat upon this very important and difficult subject I must be allowed to say that I feel my inability to discuss it in a manner worthy of its demands. My object, however, will be attained if it shall be the means of calling the attention of the farmer and stock grower to the great importance connected with the subject either scientifically or pecuniarily.

If any one is in doubt in regard to the need of better cattle, better sheep, better swine, better horses, or any other class of farm stock, he may get into his wagon or sleigh and drive through the farming communities in the different counties of this State and the doubt will give way to a thorough conviction that a very great improvement is necessary in all branches of stock culture before the farmer and breeder realize an adequate return for the care and expense of rearing animals to maturity or for market.

In this age of the world much is being written and published on the subject under discussion. Farmers' clubs and institutes are organized and in good working order throughout the State, and are a great means of disseminating practical knowledge yearly. The granges of the nation are doing a noble work by bringing farmers and their families together in a social capacity, elevating and improving in its tendency, by the discussions of the various subjects connected with agriculture and its kindred relations; controlling and conducting to a certain extent the sale and purchase of the products and needs of the farm, as well as creating a desire for improvement in his varied industries. With all these means thrown in our way, it seems as though there is nothing wanting as a stimulus for every farmer to wake up to his own interests.

In order to live (by a wise arrangement) most of the human family have to perform physical as well as mental labor. The farmer, particularly, is a man of toil, and in too many instances it is toil without thought, unless it be thoughts of dissatisfaction with his calling.

Most if not all farmers raise stock. They must have cows for milk and butter, swine for meat, sheep for wool and mutton, and horses for labor. Now, let the different breeds or kinds of animals, which the farmer raises, be of a poor breed or quality, they consume a certain amount of food, care, and time, in order that they may live, and the return is usually commensurate with the breed and manner in which they are kept. Without discussing at present the various breeds of stock, or their different merits, I wish to call attention to a few thoughts, not new, but nevertheless true. It is an admitted fact that in all improvements in stock, of the meat-producing kinds, a judicious use of good wholesome food has been one of the chief agents in such improvement. The old saying that "the breed was in the pail," has in it more truth than error, for the best breeds of stock known will, in a few generations, if poorly fed and cared for, show marked signs of degeneracy. Such, then, being the case, it is certainly good economy that every farmer who raises stock make the best use of what materials he has at his command, until he can change them for better ones.

As said before, it takes a certain amount of food and care to keep animals alive. It then follows that if it costs so much food, so much time for its distribution, to keep the animal alive, there can be no profit; on the contrary, there must be a great loss. If the life of the animal costs so much, and we would receive a profit for our outlay, it must result from additional food and care, and the more and better the food, and water, if fed with good judgment, the greater the profit, either in milk and butter, the beef, mutton, pork, or wool, or the growth of the animal, or all together, besides instituting a reform in the right direction, in the produce of said stock. We lay it down as a truth that there is economy in liberal feeding. We have better stock, more beef, more milk, more mutton, more wool, more pork, better manure, better crops, better farms, and we are better men, for we have more self-respect, and more of just pride.

I think I state a fact, when saying that a large percentage of the cattle of this State, young, growing stock included, weigh less on the first day of May, than on the November preceding, This may seem a strong statement to make, but look the matter over and there will be an agreement of opinion. Now, brother farmer, where is the economy in such methods of doing business? The feed that cost a good deal of time and expense to procure during the previous summer, the time spent in feeding it, in cleaning stables, if any were used, together with the wear and tear of the same, as well as the interest of the money invested, all thrown away for the mere purpose of saving the lives of the suffering animals of which you may have been possessed at the beginning of winter. The true way to make stock raising pay, is to so care for it, and feed, that from birth, the young animal shall grow every day, until it is ready for the butcher, or arrives at maturity for other purposes.

Plenty of good food, good care, good water, and a determination to make the best of what we have, will insure success in our undertaking. It needs no argument to prove that a yearling steer, or heifer, that will weigh from ten to twelve hundred pounds is more profitable than a two-years old weighing no more, and that such differences are common, no one, at all acquainted with our markets, will deny.

The subject upon which we have ventured to give some ideas is divisible, in its nature as well as its adaptations. It supposes a discussion of the various breeds of stock in the country, both graded and thoroughbred. To improve our common stock is not difficult. It being of so varied a nature, not having been bred to any fixed standard, or line of breeding, the use of almost any well proportioned thoroughbred male will improve it. By the use of good males then, the desired improvement may be made, always keeping in mind the necessity of giving plenty of good food and care, and using it judiciously.

Which of the different breeds, or *kinds* of stock, a farmer should raise, it is not our province to say. He should be his own best judge. A good many things may, and should be taken into account in forming a correct opinion. First, what are our tastes, and inclinations? What kinds of stock do we wish to handle? What is the productive capacity of our farms? How near are we to a good market, for milk or meat? Are our farms capable of raising profitably the larger meat producing animals, with a market convenient, and do our desires tend in that direction? If sheep for mutton be our aim, then some one or more of the large valuable mutton breeds claim our attention; among which might be mentioned, the different Downs, and long wooled breeds. If for wool and mutton combined, the "greasy Merino" should claim our attention as holding a justly honorable position. If milk be the main desideratum we might safely consult the claims of the Ayrshires. If fancy butter, the much-coveted little Jersey or Alderney might be sought. If for beef, the Hereford or Galloway are valuable breeds. If for beauty of color, fine forms, good working oxen and steers, and good beef qualities, do not pass by the high-horned, sprightly Devon. If for beauty of form, beef and milk producing qualities, large, massive bodies, many families of Shorthorns claim special attention. If hog raising is our aim, the claims of the Poland China, Berkshire, the Essex, and the improved Suffolk might safely be relied upon. In horse raising the farmer should breed that kind best calculated for his wants as farmer and roadster combined. Let professionals breed fast stock.

In what has been said with reference to improvement in our stock, the food element has been considered of great importance. Several questions of moment arise in this connection. Of what shall the food consist, and how and in what quantities shall it be used. One of the first things to be settled by the breeder is, for what purpose shall I feed? If to procure a rapid growth and large size, that class of food best adapted to make the most bone and muscle, and which tends to promote the health of the animal, should it be used. Good timothy and clover hay, corn-stalks, or straw, supplemented with a liberal allowance of half wheat-bran with one-quarter corn-meal, and one-quarter oat-meal, mixed together, and fed as the condition of the animal requires it. If flesh be the object then the same mixture, with corn-meal one-half, oat-meal and bran each one-quarter. If for milk and good condition of the animal be the desire, the above mixture is equally good. In addition stock should have free access to good clear water. Roots are also very valuable as an assistant in the growth, milk producing, or flesh forming qualities of the animals. Clean, warm stables are a necessity.

One very essential thing in this farm economy is, that animals should not be allowed to lose flesh in the fall. Too many farmers, and in fact nearly all, are in the habit of allowing stock to run and shift for themselves after the frosts have destroyed the sweetness of the grass. As a rule when animals are so allowed to run they lose flesh at a time when they should be gaining, so that they may more successfully stand the rigors of winter. "There is no error more fatal to success than neglect" "There is no condition so good for an animal going into winter quarters, as a thriving fatness." It is bad economy to neglect feeding in the fall because it does not seem late enough in the season. The health of an animal is of importance, and disease frequently follows a decline produced by neglect at this season of the year and much expense and time are required as a penalty for the neglect.

One great fault of farmers who raise stock is the habit of keeping too much. Never keep any more stock than can be kept well. Keep less and better, for there is more profit in such a course. Much has been said about the blue-grass region of Kentucky, where according to such reports, we should find the stock burdened with flesh, contented and happy. This is true to a certain extent, but how is it obtained? Not by any great superiority of soil, or superior modes of cultivation, or even a much better climate, but by nearly the reverse of our practices. While we are not satisfied unless we have from three to five head of cattle per acre in our pastures, they seldom average more than one head to two or three acres. This method allows their pastures to grow and form a thick bottom of substantial grass, so that in case of dry weather they are supplied with plenty of rich food, which readily produces flesh. Their winter pastures are allowed to grow without much stock being kept on them in the fall, and when their cold season comes (unless for a few days the fields may be covered with snow) the cattle can get a good supply of winter pasture. While our climate does not admit of this practice of winter management (and I doubt the utility of it there), still the practice of letting our pastures have more chance to throw, and then be left standing for a supply when dry weather comes, would be commendable economy. What we call our June grass is the same as the Kentucky blue grass (botanically considered), a small difference, perhaps, in appearance, due to a difference of soil and climate, and so natural is it to our sandy soils even, that if let alone and manured it will yield nearly as much food as that grown on the far-famed fields of Kentucky.

What has been said with reference to cattle applies to sheep and swine, with variations relative to the purposes for which we are breeding. If we are raising sheep for mutton principally, a liberal supply of food should be given that will stimulate the earliest maturity and fattening propensity. If for wool as the main object and mutton secondary, the slower maturing breeds should be raised, and as liberal feeding in the mutton breeds promotes growth and early maturity, in the smaller breeds it produces growth, flesh, and a large amount of good, strong, merchantable wool. No farmer should be satisfied if his flock does not shear at least seven pounds of well-washed wool, or ten pounds of unwashed fleece, and the ewes rear a large percentage of lambs. I think it is safe to say that no farm stock pays so good a profit for the outlay and care as sheep. It is highly essential that they be well cared for, and that all the aid and light which is the result of theory and experience be at our disposal. How to feed a flock of breeding ewes and keep them in a condition to produce the most wool, and at the same time raise the largest number of good lambs, is a question about which flockmasters differ. The loss of a crop of lambs is a serious matter when we come to settle up the accounts of our sheep at the close of the year. Perhaps it is safe to say that one-third of the lambs of this state are yearly lost from one cause or another, and a large per cent of this loss arises from a want of proper care and attention during the lambing season. The remedy for this trouble is obvious; but to other causes of mortality, such as weakness, loss of vitality, goiter, etc., all shake their heads, for with a similar mode of treatment as regards feed and care, the same flock of ewes will raise most of the lambs dropped one season, and lose nearly all the next. The same mode of treatment proves good one year and bad the next. One man has one remedy and another a different one, most of which fail when tested. One man feeds clover hay to his breeding ewes and loses his lambs from goiter. Another feeds in a similar manner and has good luck with his. One gives his ewes plenty of food and exercise and loses his lambs; another gives plenty of food and no exercise and raises his lambs, and so on to the end of the chapter. With all these facts of experience and observation before us, conflicting as they are, what shall we do? The question is easier to make than to answer. It is our opinion that no solution of the vexed question has ever been made relative to goiter and its kindred maladies.

There are some suggestions, however, that we will venture to offer. and they can be received for what they are worth, or discarded as worthless. It is a physiological law, that in order to live, animals must eat and drink; that if left to themselves, especially sheep, they will seek a great variety of grasses, weeds, etc., for food, and good clear running water if possible, and if both food and water be abundant, accompanied with plenty of exercise, they will thrive well and rear their lambs well. Especially is this habit of exercise natural to the Merino family, made so no doubt from their earlier habits of roaming from Cabana to Cabana in search of food. As nature is a good instructor, it might be well to apply her teachings, or some of them, in the case of a flock of breeding ewes. First, when we come to feed for winter give plenty of different kinds of fodder, such as clover hay, marsh hay, straw, stalks, etc., alternately, with plenty of exercise and plenty of good wholesome water, at the same time keeping their dwellings well ventilated and well littered, making them healthy, and a good protection from the storms and inclemency of the weather during our winters. As a sire, select a thoroughbred, of good robust constitution, of good family, and in all respects as he should be, and I think the farmer has done his duty, and may await the result without much fear.

As our paper is already becoming lengthy the subject matter of the thoroughbred must of necessity be brief. Improvement in this class of stock is much more difficult to obtain. One reason is that so many men are engaged in it whose models or types vary so greatly. One breeder is a strong advocate of the Bates family of Shorthorns; another of the Booth family; another of a mixture of both families. A's model is a large, massive animal, rangy, standing up proudly and grandly, representing certain characteristics pleasing to himself and those who agree with him. B's model is low in stature, blocky, compact, fine boned, meaty animal, and so on through the list. Another breeder prefers the Herefords, with their peculiar colors and fine carriage and far-famed meat producing qualities. Another the Jerseys, or Devons, or Galloways, or Ayrshires. One breeder prefers what have been known as the Atwood blood in the Merino family, another the paular, mixed with the Atwood family. One prefers the black-faced sheep, another the long-wooled breed. In swine, one prefers the Poland-China, another the Berkshire, and another the Essex or Suffolk. In horses, one chooses the farm horse, another the trotter, and another the thoroughbred or running horse. Which is the better of all these different breeds or kinds of stock it is not our province to decide. Each breeder will settle that matter to his own satisfaction. The question is, how shall improvements be made? The same great physiological laws underlie and apply equally to all classes or breeds of thoroughbred stock. In their application breeders differ, and hence the great diversity of results. Without taking up the time of this Institute to discuss the various theories advanced by different writers upon the subject, and in which a majority of the members present have no special interest, I shall state a few general facts and leave the subject.

Every breeder of Short-horns, of Devons, etc., of Merino or large breeds of sheep, should thoroughly understand their family history or breeding. In Short-horns he should be able to trace the breeding to the importations and beyond, and after having carefully studied this he should look carefully over his herd, noting the different families represented, the points of improvement he wishes to make, and then purchase the bull most likely to make such improvement, regardless of what it will cost, unless the price be extravagant. Now, here is a difficulty, for frequently a well bred and good formed bull has not the strength of breeding to stamp the desired qualities strongly upon his offspring; and hence the necessity of studying carefully the breeding of any bull the breeder proposes to buy. Because a bull is thoroughbred and registered in some one or all of the Short-horn herd books, it is no reason that he should be purchased as a stock animal. That sire is worth the most, and the one that can the most safely be relied on, that produces the greatest similarity in his get, and that in the right direction. And we would be more likely to find such qualities in a bull that shows by his ancestry that a care has been taken to breed in a certain direction and for a certain purpose through several generations, either through in and in breeding, or what might be called line or type breeding. Bulls promiscuously bred should not be sought to stand at the head of thoroughbred herds. By the term "promiscuously bred" we mean animals whose ancestry shall have been first one strain of blood and then another. One cross from the Booth bull and one from the Bates, and so on in different families all mixed in. It is not necessary that a sire should be pure Duke, or Bates, or Booth, but that the several late crosses should be either one or the other. If the characteristics of the Booth family suit best, a well bred Booth should be used; if the Bates family is preferred, then a bull with several Bates crosses on top should be secured. With a strong bred herd of cows it is very necessary that a bull of strong prepotent powers should be used, and that line of breeding be sought which is in accordance with the blood of the herd. The male should possess the color, disposition (if possible) and form and character of the calves you covet. All things considered, I would rather breed from an ordinary formed bull well bred in the direction I wished than from a superior looking one not so well bred, expecting the strength of breeding would more than retrieve the lack of good looks in his offspring.

What is true in cattle is true in sheep and swine, also in horses, though in breeding horses the end sought is so different that many other things have to be looked after, namely: endurance, strength, speed, size, soundness of limbs, beautiful action, intelligence, etc., etc.

Mr. President, if what has been hastily and imperfectly thrown together in this paper shall be the means of calling attention to the subject of stock-raising, and better care be bestowed upon our domestic animals, and the breeds improved, all will have been accomplished that was desired.

DISCUSSION.

Mr. Gully wanted to know if it would pay the ordinary farmer to breed pure blooded animals.

Mr. Ball said it depended much on the men. If a man wants to go into the business for the sake of improvement I would advise him to go in. But if a man goes in for competition I think he will not find it profitable. I think high grade cattle much better for milk than pure bred, but on the other hand I believe the pure bred to be better for beef.

Mr. Marsh wanted to know whether the first or second cross with a pure blood is not more profitable for a farmer than a pure blood.

Mr. Hobbs answered this by stating a case where he had purchased a flock of 50 sheep for $1,000, and had made a good profit. He believed in pure bred animals. He would not advise all to raise stock, but to those who do, he would advise them to get the very best animals.

Mr. Dryer said he indorsed all that was said by Mr. Ball or Mr. Shearer. There are two clases of men who should not invest in fine stock, those who abuse their cattle and those who do not know how to handle them. There is much truth in the statement that cattle treat each other as they are treated. A man who does not love animals will lose money in keeping them. I am sure that $100 paid for Short-horn cattle is a good investment, beyond that I cannot say.

Mr. Lyon said one thing was certain, that a little extra expense in keeping a flock of sheep often determined the whole profit on a flock. I have made more money by investing in good sheep than in poor. It will pay to pay a good price for a good animal.

Mr. Dryer told that Mr. Shearer paid $20 for a calf in May. This calf was from a small native cow and a good sire. Shearer kept him five months and sold him for over $50, by weight.

Mr. Shaw thought any man should know more than to pay $2.50 for a sheep that would only shear 1½ pounds.

Frank Gully.—Would a thoroughbred be worth any more than a high grade that in every way looked as well for feeding purposes?

Mr. Wood.—I believe not.

J. N. Smith said there was much difference in the quality of grades. A well bred sire often transmits nearly all his qualities to his offspring. I believe it would add 25 per cent to the live stock of Michigan within five years if thoroughbred sires are used exclusively.

George Mallory, of Delhi.—Is it as much profit to sell for beef when 15 or 18 months old as when older?

Mr. Wood.—The younger the better.

AFTERNOON SESSION.

Prof. A. J. Cook gave a talk on the Hessian Fly which was followed by a discussion on the same subject.

Miss Eva D. Coryell, of Williamston, read the following essay on—

A PRACTICAL EDUCATION FOR WOMEN.

Time has been when a person was considered well prepared to meet all the ordinary exigencies of life if he could read the newspapers, write, and do sums, a term which included all kinds of problems in arithmetic. Now, it is universally acknowledged that one's power for usefulness and capacity for enjoyment is almost indefinitely increased by a more complete education. As the means are within the reach of almost every one, we expect them to be equal to the advantages given.

The question, shall I procure a good education? is scarcely ever asked, but now it is, what and where shall I study?

He who chooses the administration of the law for his profession need not hesitate about the place to pursue his study. The State has considered his profession an important one, and has made it her business to establish a department at the University expressly for him.

Some would lessen the sufferings of humanity by battling its enemies found in sickness and disease. 'Tis well that the State gives to such her fostering care. The teacher, the farmer, are both given an opportunityfor fitting themselves for their calling, and the State is largely repaid by having efficient workers in these fields.

But where shall the girls be educated? The time is past when a girl could be satisfied with a common school education, and in general she does not intend to study any of the professions. She does not often make a specialty of any study; but, for her own happiness and usefulness, not many will object to her having a good general education, such an education as she would get at any college. But in taking such a course she labors under quite a serious disadvantage. Among all nations in all times of which we have the records, the charge of the housework has devolved upon woman, and, as a custom of so long and so universal a standing, is not liable to change very soon; it is quite necessary that woman be capable of doing credit to herself in looking well to the affairs of her household. When it was customary for the young miss to remain with her mother until in her maturer years she left to become the mistress of a home of her own, she acquired under that mother all the skill of the perfect housewife, just as an apprentice gains skill under a master workman. Now her apprenticeship is often limited to a few minutes before and after school each day, with but a little better chance during vacations, through childhood, and just when she might begin to learn the art she is ready to enter college, where she loses all the skill that she had before acquired. At the end of her college course she returns to her home, probably well read in the languages and the literature of the day, with a little knowledge of the sciences, but with no knowledge whatever of housework. Being awkward at this she soon has a perfect horror of housework, and how can we expect her to feel otherwise? If we were set at some intricate work, seeing others glide around easily, while every movement we made was perfectly grotesque, how soon we would leave it in disgust. If it is necessary for such a one to pursue this work, the tears shed over heavy buiscuits, sour bread, etc., is a loud argument that her education was not made complete. What shall she do? Which education can she afford to neglect? Some say the college, some the home. I would say neither. Combine them in a school, and thus combine the efficient housekeeper with the good scholar. Some have thought it impossible to combine the two. One reason why they are so often found apart is because the courses of education are so widely separated. If you wish to combine them in the individual, combine the two courses in her culture. Can this be done? There is no school of this kind in our State, but we see no reason why such a one could not be carried on successfully.

Once the possibility of uniting practical farming with a college education was a question of just as great doubts as this. Its success is beyond the expectations of the most hopeful. Can we not have a school for ladies based upon the same principle of uniting practice to theory, uniting labor and study?

It seems strange that our State thinks all leading pursuits of men of enough importance to found special schools for their benefit, while that pursuit which has widest range of all does not receive a passing notice. Is it not the duty of the State to provide a school giving to girls the education of which I speak?

How could a school be conducted to give her these advantages? It is a very simple problem—add to an ordinary college course some instructions in domestic economy, and unite with it a certain number of hours of daily work. On account of the expense of founding a new school it would be economy to add these advantages to some school already in operation. Where could it be most easily and successfully adopted? There is an objection to having it connected with the university. From the manner of the management of that institution it would not be well to have a boarding-school connected with it.

At Ypsilanti the course is too technical for an ordinary education, and for its object it is better for it not to be changed, and it would be necessary to add another course, which would take away its force as a teacher's school; besides, a change must be made in regard to their manner of boarding, that they might have the work connected with their study. What objections can there be to uniting such a school to the Agricultural college? For general practical value its course could not be bettered. If but slight changes were made its course would give to girls just the culture they need. The school need not be changed at all from its present methods of working. Substitute in place of agriculture some study suited to a girl's education, and we have an excellent lady's course. The teaching of the chemical department could scarcely be bettered in regard to its practical value to her. It now has a course of lectures in dairying, teaches methods of canning and preserving fruits, how to make jelly, best methods of cleansing, and many other things of equal value to her. Of pure mathematics there is none too much for a lady's course. The natural sciences, French, moral philosophy and psychology are all necessary to a course of studies for ladies.

Looking over the whole list of studies pursued at the Agricultural college there are none objectionable to a ladies' course, only the technical studies pertaining to agriculture. Substitute domestic economy in place of them and we have a better course for girls than any other college affords. Some may still be fearful that it would not be a good place for a girl's school. Who is better able to judge than he who has been connected with that institution through all its growth? The president for seventeen years; and none could be more careful of its welfare than he. But listen to his words addressed to our State legislature: "I am strongly in favor of adding a department for women, and can see no reason why such a one should not be useful and successful."

Many others have expressed a similar opinion on this subject. Is not this a subject that deserves our earnest thought?—a need that ought at once to be satisfied?

To fit humanity for the places which they are to fill is a noble work, and always gives great results. Our State, in the advantages it gives to youths, should not neglect the true culture of her daughters. Though woman's life is secluded, her work not often open to public gaze, yet fitting her for her duties will never be a waste of means.

Not only should such culture be a blessing to herself: of homes, hundreds would be brighter, of hearts, thousands would be lighter.

Mr. N. A. Dunning read a paper on

FARMERS' CLUBS,

in which he advocated the organization and maintenance of farmers' clubs for the good they accomplish in furnishing means of enlarging the farmer's store of knowledge,—as a source also of intellectual growth and social improvement.

EVENING SESSION.

Prof. R. C. Carpenter gave his lecture on

OUR PATENT SYSTEM.

(See lectures given at more than one Institute.)

Mr. I. B. Woodhouse, county drain commissioner, read the following paper on the

CONDITION OF THE DRAINED SWAMP LANDS OF INGHAM COUNTY.

It is only because I have a firm belief that there is a mine of wealth undeveloped in the swamp lands of this county, and that discussion and investigation by such bodies of men as compose this institute must lead to a better understanding of what steps are necessary and best adapted to bring these lands under cultivation, that I have consented to come before you and try to give what aid I can, by calling attention to such matters as have come to my notice, and giving expression to certain opinions I have formed upon the subject; and I trust that your great interest in the matter may render you blind to all faults in the manner in which it is presented.

The county of Ingham is composed of sixteen townships, containing 354,227 acres according to the United States survey. Of these, as near as I can determine, about one-seventh, or in the neighborhood of fifty thousand acres, was originally swamp land, or land which, in a state of nature, was too wet for cultivation, and required some artificial drainage to render it suitable to raise the various crops which are cultivated in the country. These lands differ fully as much in quality, depending upon their location and situation, as do the uplands. Many persons suppose all muck lands similar—that a swamp is a swamp, and that though the timber may differ, yet the soil of all swamp lands is in fact the same—that is, muck. Though this, in one sense, may be true—that the soil commonly called muck is composed entirely of vegetable matter, and thus far may be all alike—yet it differs so widely in its situation and condition, in what it will and will not produce, that, as I said before, it is no more uniform than the soil of the uplands. The differences of the soil are generally indicated by the timber and other vegetation growing upon it, and a close observer has little difficulty in forming an opinion, from an examination of the vegetation upon a given piece of wet land, of what will be required to reclaim it and render it capable of producing the various crops most suitable for such lands. That upon which grows black ash, elm, soft maple, swamp oak, etc., generally requires nothing but to be rid of the surplus moisture to produce immediately the very best yields of all kinds of spring crops, and sometimes of wheat. Upon these lands the muck is not deep and is thoroughly rotted and pulverized, as these kinds of timber will only grow where their roots can penetrate through the vegetable and into the mineral soil beneath, and they are always so situated that when in a state of nature, they will be dry during a considerable portion of the year.

Another kind of swamp lands produce at once, when drained, excellent crops of hay and some of the moisture-loving vegetables, such as roots. etc. Upon these the muck is deeper than upon the last, is less thoroughly rotted and less finely pulverized, and the natural growth upon them is generally willows, alders, and sometimes small sickly tamarac, it being too far advanced in becoming soil to be suitable to produce a healthy growth of the latter. It will be so situated that the water remains longer upon it in the spring and fall—that is the basin will be deeper in which it lies—than in the case of the last kind.

Another kind needs to lie some time after the water is drawn off, to rot and pulverize and settle together before producing good crops of even the most water-loving grasses fit for hay—such as red-top, foul meadow, etc. The muck upon these lands is much deeper, and is composed of vegetable substances not thoroughly decayed, and in many cases maintaining their natural shape, so it is not difficult to recognize the species of vegetation producing them. They are so situated that the water remains upon them a still greater portion of the year; that is, the basin they lie in is still deeper than the last. The vegetation is generally tamarac or spruce, which spread their roots widely over the surface instead of sending them down deep into the muck, or they are open marshes. This latter is much the largest class of any, probably comprising nearly one-half of the whole swamp lands of the county.

And still another kind needs to lie a very long time after the water is drawn off before it is in a fit state to produce any valuable crop at all. Upon these the muck is very deep, consisting principally of unrooted grass roots and other vegetable substances nearly unchanged; it is generally so situated as to be under water nearly the whole season through. The vegetation consists mainly of the various sedges or flat-leaved wire-grasses, rushes, etc. Such soils must have time to rot and settle down and become pulverized before producing valuable crops. It is frequently benefited, and its fitness for cultivation greatly hastened, by burning off a foot or two of the surface after draining off the water. The basin containing them is generally very deep, and as they waste away and settle down a great deal in becoming fit for cultivation. they require very deep draining, and are generally the most difficult to drain deep enough; for lying, as they do, in a deep basin, it generally requires a very deep ditch a long distance through the hard land to get sufficient fall to thoroughly drain them. Of course, I would not wish to be understood as saying that all our swamp lands are of exactly one or the other of the above types, but that those are the principal varieties most usually found. The difference in the condition of the muck upon them is, I believe, caused in every case by the depth of the basin in which they lie—in the deeper ones the muck accumulating to great depth, and being under the water nearly all the time does not decay or change, while in the shallower ones the water entirely evaporates and the muck decays rapidly, being alternately wet and dry. and becomes the same deep, black, rich vegetable soil which covers the prairies of Illinois and Indiana; and I believe it to be only a question of time and drainage when all will be equally fertile and valuable.

Nearly all these swamps were formed or caused by beavers. The time was when there were no swamps. The land now covered by them was bottom land, bearing a growth of swamp-oak, elm, soft maple, etc., with a brook running through. The beavers came and built their dams and raised the water over the roots of the timber deep enough to kill it, and in time the dead timber fell and the pond filled up with vegetable matter until a soil was finally produced for the present swamp growth. This is proved by finding the dams, and by finding in the bottom of every swamp, no matter what is its present growth on the surface, the kinds of timber I have named buried deep—in fact at the bottom of the muck. This is almost always the case. You will find the hard timber at the bottom, though you may find, and frequently do, several generations of swamp timber above it. These swamp lands were almost entirely useless for any agricultural purpose, and the little that could be realized from their timber or pasturage or (in the case of open marshes) the wild hay that might be cut upon them, furnished but a poor return for the capital locked up in their purchase and the taxes annually paid upon them.

Covered, as they were, a considerable portion of the year with water and decaying vegetable substances, they were fertile sources of malaria that would load the atmosphere with the germs of such diseases as fever and ague, chill fever, and others of a kindred nature; and scattered as they were all over the county, few would escape their influence. Consequently, before anything was done by drainage to mitigate their influence, the diseases caused by malarial poisoning formed a very large majority of all the sickness and suffering from disease in the county, and rendered necessary nearly all the expenditures for medicines and medical attendance, as well as the loss of time caused by sickness; and I am informed by medical men, and those, too, best qualified by their experience and practice to judge, that the change in that particular since the county drain system went into operation has been marvelous, and that malarial diseases have almost entirely disappeared—in fact, it is claimed by many that the saving to the inhabitants of the county from that source alone would pay for digging all the county drains which have been dug. I am inclined to believe myself that the claim is well founded.

The county is greatly favored by nature in the matter of drainage. It forms an irregularly rolling plateau, descending from a point a little south of the center in three directions—south, west and north. Grand river encircles it from a point a little south of the center of the south line of the county to the extreme northwest corner, while the Red Cedar river, from the center of the east line runs north nearly to the northeast corner, and then westerly through the north range of townships until it unites with Grand river nearly at the northwest corner of the county, these two rivers encircling the county, always near the line, for fully three-quarters of its circumference. Both of these rivers are beautiful, swift-flowing streams, with bold banks, and timbered to the water's edge. The former furnishes four and the latter two water powers between where they enter and where they leave the county.

In addition to these two large rivers encircling the county as they do, it is intersected by numerous smaller streams which, rising in the central part, flow outwardly, and empty their waters into the rivers. Some of these streams are the Sycamore, Mill, Dorrel, Willow, Webb, Mead, Hawley, Doan, Deer, and Dertz creeks, and many smaller ones either emptying into these or directly into either one or the other of the rivers. The heads of these streams interlock in the central part of the county and they flow in the three directions mentioned, thus furnishing admirable outlets for almost every part of the county. And it is along these streams and the branches radiating from them, and emptying their waters into them, that most of the swamps of the county are situated. This formation renders the task of draining an easy one, it being generally only necessary to provide a channel through the swamp to be drained and to follow the natural flow of the water, deepening the channel until it intersects some one of these streams sufficient to carry away the waters to one or the other of these rivers.

The county drain system went into operation in this county in 1870, and the amount done in each year since is as follows:

1870—7,291 rods, or 23¼ miles of drain, at $1.306 per rod	$9,527	80
1871—9,457 rods, or 29⅔ miles, at $1.367 per rod	12,914	05
1872—8,111 rods, or 25¼ miles, at $1.025½ per rod	8,309	35
1873—3,125 rods, or 9 miles 269 rods, at $1.352 per rod	4,328	45
1874—10,708 rods, or 33 miles 148 rods, at $0.822 per rod	9,804	27
1875—10,414 rods, or 32 miles 174 rods, at $1.128 per rod	12,761	91
1876—20,641 rods, or 64 miles 161 rods, at $0.803 per rod	16,580	33
1877—2,834 rods, or 8 miles 274 rods at $0.637 per rod	2,504	24
1878—27,138 rods, or 74 miles 225 rods, at $0.399½ per rod	10,838	32
1879—7,056 rods, or 22 miles and 16 rods, at $0.47 per rod	3,298	80
Making a total of 324 miles 29 rods of drain, costing a total of	$89,868	02

Some of these drains are twice counted in making this total, having been reconstructed and deepened; but there is at least 250 miles of drain in the county which has been dug under the county drain system. Added to this, there is a large amount of township drain in the county—how much I have no means of forming an intelligent opinion.

These drains are sufficient to draw the surface water from nearly all the swamp lands in the county—that is, there are but few swamps of any considerable size left in the county upon which the water will stand upon the surface, except in very wet weather, when there is more water than the ditches can carry. Some small detached swamps are not drained at all; but I do not know of a large swamp anywhere in the county which is entirely undrained, and most of the additional work required to be done by the county drain commissioner in the future will be in adding a few branches to and deepening the ditches already done. The deepening is the important and expensive job, and although nearly all the swamp land is now drained sufficiently to prevent water standing upon the surface, there is but a very small portion drained deep enough to enable under drains, put down the necessary depth, to be discharged into them. This deepening will be done gradually; and as the necessity for it appears in each case, or as the owners desire to put in the tile drains which are to supplement the work of the open county drains—the latter only furnishing the main outlets and principal water courses for the systems of under drains which each owner will put in to suit himself, and when he has considerable money invested in under drains, and finds them discharging into the main outlets a foot or two below their bottoms, he will soon see the necessity for and be willing to stand the expense of putting them down the necessary depth.

The open county drains, in some few cases, drain the lands sufficiently for cultivation, and in many cases sufficiently to enable them to produce fine crops of hay; but of course a piece of wet land must be quite narrow if a single drain, however deep, running through it, is expected to drain the whole of it sufficiently to render it dry enough for cultivation. In every case where the lands are drained sufficiently and the muck is thoroughly rotted and pulverized, the crops which they produce are a matter of astonishment to all beholders. They far exceed the very best of the uplands in productiveness, and as I said before, I believe it only a question of time and drainage when all will be equally fertile and productive.

Soon after the commencement of operations under the county drain law system, a State convention of county drain commissioners was held at Detroit, and at that convention the present style of ditch was adopted, and has since been adhered to. The bottom of the ditch is one, two, three, and four feet in width; the sides flare at an angle of forty-five degrees, or one foot slope to one foot rise; the excavated earth to be removed twenty-four inches from the edge of the bank, and to have the same slope as the ditch. This form has been found best for many reasons. The angle of forty-five degrees is within the angle of repose of nearly every kind of material of which the banks of ditches are composed in this county. Widening so rapidly, the carrying capacity of the ditch increases rapidly as the water rises in it, and yet furnishes the maximum depth of current in low water, and will carry off obstructions that would lodge and clog a wider and consequently shallower current. The sides being within the angle of repose of such soils, there is less liability to cave than with steeper banks, and less liability to wash than with flatter ones.

This shape of ditch makes the width on top depend upon the depth; and as they are now dug three feet deep in the low places, and deeper in the high ones, the ditches are not less than seven, eight, nine and ten feet wide on top, the larger or smaller size being used in each case according as there is much or little water to be carried away.

In the beginning of drainage under the law, some mistakes were made, as would be likely where all parties, both commissioner and owners, were entirely without experience; the most important ones being, in not making any allowance for the settling of the muck when the water was drawn off, and in making the first ditches too small and too shallow. (The latter error I think is not yet entirely corrected.) The first drains were only dug two feet and two and a half feet deep. And in digging from a swamp through hard land, as is often necessary to provide an outlet, the ditch was generally dug no deeper in the hard land than in the muck. In such case, although when dug, the ditch through the bar would be deep enough to draw all the water out of the ditch, in the swamp; yet, as the muck settled down and packed together and rotted away, after the water ran off, it would often be so low that the bottom of the ditch, in the swamp, would be a foot or more deeper than in the hard land, and the water would stand in it to that depth. Add to this the fact that the sides of the ditch in the swamp would settle down until a ditch through a wet swamp or marsh, that was honestly dug three feet deep, would not be more than a foot or fifteen inches deep when it had done settling, and you have the causes of the failure of many of the earlier drains. These faults have been corrected in the later drains. None are now dug a less depth than three feet. I am confident that a depth of four, instead of three feet, would not only be much better but would be cheaper in the long run; though it is difficult to convince the owners that this is the case, except by experience.

Nearly every ditch in the county, except those constructed within the last two years, either has been or will be reconstructed and dug deeper; and this, not because they have filled up or were not orignally dug the full depth, but because they have almost disappeared by the gradual subsidence of the general surface of the drained lands. A ditch dug through a very wet swamp or marsh, in muck that extends to the bottom of the ditch, fully four feet deep, will not generally be more than a foot and a half deep at the end of two or three years. The reason for this is that the muck is like a saturated sponge, and when the water is drawn out, it shrinks and settles down and rots away a great deal more than would be thought possible by one not acquainted with its nature. This same fact caused another error that was very injurious to some of the earlier ditches, and that was, that finding the water deeper around the edges of the swamp than in the center (as is almost always the case), the drains were placed along the edges, upon the theory that the ditch should run through the lowest ground, and that must be where the water was deepest. The result of this was, that when the water was drawn off, the surface settled most where the muck was deepest, which would nearly always be in the center of the basin, and as a result, you would have wet land in the center of the swamp, which the ditch, being upon the higher ground near the edge, would not draw the water from. This error is a very serious one, and its effects increase from year to year, as the muck keeps constantly rotting and settling more and more, while the ditch near the edge, generally so near as to reach through the muck into the solid soil beneath, does not stir.

It cannot be too earnestly urged and insisted upon that the place to run a drain through a swamp or marsh, to dry it most effectually, is where the muck is deepest, and that is in almost every case near the center.

There is another idea in connection with this matter of the wasting away and subsidence of these drained lands. There are none of the swamp lands that may not be drained in some direction by digging through a barrier in no case greatly exceeding three feet above the natural surface of the swamp; because any basin having a watershed sloping to it sufficient in size to fill it with the annual rain-fall, and surrounded with a barrier much higher than the annual evaporation—which must equal the annual rain-fall—and is about three feet, will be a lake and constantly filled with water to within that distance of the top of the barrier or outlet. Therefore, the natural surface of none of the swamp lands is much more than three feet below the natural outlet. But many of these lands *were once* undoubtedly lakes, and the basins in which they lie have been gradually filled up by the annual deposit of vegetation until the bottom was brought so nearly upon a level with the outlet as to be laid bare by the annual summer evaporation, when they became lands. Now when it is intended to deepen the outlet in order to run a drain through such a piece of swamp, with a view to fitting it for cultivation, it is most important to know what is to be the ultimate depth of such a subsidence; or we may find that, after having deepened our outlet as low as the natural descent of the ground below will permit, our drained land, continuing this process of subsidence, may sink below the outlet as deepened, sufficiently to render the land as wet as when we began draining, and lose to us all the results of our labor. For my part, I cannot tell where the limit of subsidence will be in any case; and it would often be a great assistance in deciding whether or not to attempt the reclamation of a given piece of swamp land were it authoritatively ascertained how far, for instance, a piece of raw muck ten feet thick would waste away and settle down before the point would be reached when the annual vegetable addition would equal the annual waste and the surface would remain constant. If some of you farmers would select such a basin filled with muck to a considerable depth, and so situated as to allow of its being thoroughly drained to the bottom, and after so draining it and making the height of the natural surface, would cultivate it until all subsidence of the surface ceased, keeping a careful record of the depth of the muck originally, and of the amount of the subsidence of the surface each year, you would be doing much toward solving one of the most perplexing questions connected with this subject of swamp land drainage.

Of course for such an experiment to be valuable the natural condition of the muck, that is, whether much or little rotted, must be carefully noted and known.

In conclusion, Mr. President, these lands, occupying as they do the valleys and basins of the country, the soluble elements of fertility from the highlands have been washed away and carried down into them by the water for ages; and it seems to me that the true course to pursue is to drain and reclaim them and then plant upon them the coarse grains, grasses and roots they are so admirably calculated to produce; and, as I said in a paper read to your club, I believe that the ideal model farm of the future will be composed of one-half swamp and one-half upland; upon the first will be raised enormous crops of coarse grains, hay and roots, which will be fed to stock upon the farm, and the manure spread upon the uplands will give the necessary fertility to raise the fifty to seventy-five bushels of wheat to the acre, which is to make farming profitable and the farmer rich and prosperous.

Mr. J. N. Smith, of Bath, gave an unwritten address on the drainage of swamp lands, which was discussed as follows:

F. A. Gulley.—How do you lay tile on the muck?

J. N. Smith.—Do not have any trouble if the ditch is not stirred beyond the required depth. I use blue clay to protect the joints.

J. P. Thompson.—How deep should the tiles be laid?

J. N. Smith.—At least three feet. I think we use altogether too large tile. I believe, roughly speaking, a two-inch tile will drain 20 acres.

Prof. Carpenter.—Did you ever drain 20 acres with a two-inch tile?

J. N. Smith.—Yes, sir.

Prof. Gulley.—What does it cost per rod to dig a ditch in muck 3½ feet deep?

J. N. Smith.—One good man would dig 15 rods a day.

Prof. Carpenter.—I believe Mr. Smith to be much mistaken in regard to the capacity of tile drains. We have in one place at the College a four-inch drain in good order that does not satisfactorily drain 20 acres. The rule for area given by the drainage engineers of Indiana is that a tile will drain as many acres as the square of its diameter in inches. By that rough rule a two-inch tile will drain four acres, a three-inch tile nine acres, and a four-inch tile sixteen acres, and this will give as a general thing a satisfactory result. I have been over some of the drains put in by Mr. Smith, and have as a general thing found tiles whose size is roughly approximated to the area to be drained by the above rule. I would like to ask Mr. Smith if the 20 acre area drained by two-inch tile is not gravelly or sandy?

Mr. Smith.—It is quite gravelly and very porous.

Resolutions of thanks to those who had participated in the Institute were unanimously adopted, and the Institute declared adjourned.

LECTURES GIVEN AT MORE THAN ONE INSTITUTE.

MANUAL LABOR AT THE MICHIGAN AGRICULTURAL COLLEGE.

BY PRESIDENT T. C. ABBOT.

[Spoken at Manchester and Romeo Institutes.]

When a student enters the Agricultural College he is set at manual labor, three hours each afternoon, every day of the week except Saturday and Sunday, and he continues this work until within a few weeks of the close of his four years' course of study. It is long continued, real work, and for it he is paid wages from eight cents an hour as the highest down to nothing, if he earns only that. The students work as faithfully as they study, and they study as well in this college as students study in any college with which I am acquainted. There is as much ambition to stand well in wages as in lessons, and a large proportion of the students ask for, and sometimes receive, additional work on Saturdays. No doubt one might see students and parties of students at times neglectful or careless in their work, as he may also see them in their studies. But, as a general thing the work is well done, and you may any afternoon see parties of students under one of their number as a foreman, and solitary students unconscious of observation, working steadily and with a faithfulness that shows they are interested in their work, and are conscientious in the discharge of duty and the gaining of correct habits of labor.

In the sophomore or second year of a student, all his labor is performed in the Farm Department, so that he may be enabled to see the work of that department in its entirety. In the Junior or third year, he labors only in the Horticultural Department for a similar reason. While seniors, in their last year at college, they work upon farm or in the horticultural department as they may be needed, or as their future pursuits may make them to choose.

The seniors frequently act as foremen of gangs of students at work. One senior has had charge of the construction of a drain, others of fence building, or of surveying and leveling for drains. In the Horticultural Department, Professor Beal says, Report 1878, p. 67: "About one-half of the students of the senior class have worked all the year in the Horticultural Department. Some of the most important part of the instruction is given separately to each of these young men while they are overseeing certain kinds of work. One senior is set over some portion of the department for the whole year. One looks especially after the vineyard; one the apple orchard; one the orchard of pears, cherries and plums; another the trees on the lawn; another the drives and paths; one the hot-beds and a portion of the vegetable garden; one the wild garden and testing seeds; one the experimental and sample beds of grasses, clovers, etc.; another some portion of the vegetable garden." These seniors work in these duties and at the same time act as assistant foremen in directing the labors of other students.

Two afternoons each month each junior labors under the eye of the professor in nicer operations that cannot well be described in the class-room, and for this work he receives no pay.

Such is, in brief, the labor system in the Michigan State Agricultural College. In the first years of the institution, as in its inception, the labor system was looked upon chiefly as a means of enabling the sons of farmers of limited means to work their way through college. "First and foremost," says Mr. J. R. Williams, the first president of the institution, "the farm is the instrumentality by which students can earn a portion of their education. The remuneration, after the estate is subdued and rendered productive, ought chiefly to board the student, leaving but few expenses incumbent upon him." The labor still serves to render an education at the College comparatively inexpensive, especially as the long vacation occurs in winter, so that the same student whose labor has helped to defray his expenses during the summer, has an opportunity, by teaching a winter school, to earn still more. Not infrequently these two sources of income nearly pay the expenses of students through the entire four years' course of study.

But after a year or two a different view of the uses of labor in the College was taken. It was looked upon as necessary chiefly for its educational value. The farm, gardens, orchards and other working places of the College were spoken of as similar in use to the chemical laboratory—a place for the practice of the principles and rules taught in the class-room. The attempt is made throughout the course to give an intellectual character to manual labor, to make it illustrative of principles and suggestive of such inquiries as become a mind awake to the beauties of the natural world, and the grandeur of the forces, and the laws that explain the operations of nature. Labor may have added to it this intellectual dignity, but it is necessary for purposes of moral discipline that this work should not lose its character of hard labor. The labor is not, therefore, like the unpaid practice of a chemical student in a laboratory, nor of a young machinist in a technological school. The College labor is continuous for four years, is applied where hired hands would otherwise be employed, and is largely of the sort which the home education of the student has prepared him to do well. He is usually qualified to earn wages when he comes to us. It would be unfair to impose so much hard labor without recompense, although the educational purposes of the institution make it advisable to require the work of all its students.

It may at once be owned that the operations of the College would be much simpler in the absence of a labor system for students.

It is expensive. Officers who have charge of farm and gardens cannot give so much time to class-room exercises as they could do without these cares. Skilled foremen must be secured and paid and the quantity of tools increased above the natural needs of a farm. When also the work upon the farm or horticultural department is planned for a force working but three hours a day, and only in the afternoon, and with a direct view to the practice of students, it is not possible to plan it at the same time with reference to the highest profit.

It is found also to be a very difficult thing to manage a farm on this plan. How to keep the students all at work advantageously both to themselves and us is no easy problem, but it is one that presents itself daily to the managers of the work, from about the first of March to near the close of November. And this difficulty will increase upon us, as the finishing up of the drainage of the farm and other permanent improvements leaves only the ordinary work of the farm, and of the horticultural department to be done. Only great advantages educationally to the student could warrant the college in endeavoring to keep up a compulsory system of manual labor.

I propose, therefore, in a plain way to examine some of the advantages of the labor system.

There are physical, intellectual, and moral results of a labor system, and these we will examine in order.

1. We hope by the labor system to have our graduates possessed of that physical hardiness that is required in the farmer. The runner, the wrestler, the rower, inure themselves to their play. The military school exercises the scholars in daily and long-continued drill. Why should not he who is preparing for a more useful occupation maintain by a proper exercise of his muscles the strength he will hereafter need. I find in the University Medical Journal for April, 1871, a statement by Homer O. Hitchcock, M. D., of Kalamazoo, that is in place here. He says: For the most perfect and healthful development of the body, it is absolutely necessary that the muscular system should, while the body is maturing, be developed by the habitual use of all the muscles, and this cannot be attained, at least so well, in any other way, as by actual labor. When the muscular system is thus developed, the digestion is made powerful, the lungs are enlarged by increased respiration, and the blood, more perfectly depurated, increases the size and especially the functional activity of the brain. "A very large majority of the secondary callings," says Gail Hamilton, Atlantic Monthly, July, 1864, "remove men from the open air, often from the sunshine, and generally train one or a few faculties at the expense of the others." "The shoemaker must bend over his lapstone, and he becomes stooping and hollow-chested. The blacksmith twists the sinews of his arms to strength, but at the expense of his other members. The watchmaker trains his eyes to microscopic vision, but his muscles are small and his skin colorless. The artisan carries skill to perfection, the genius towers into sublimity, but the man suffers. Not so the farmers. His life is not only many-, but all-sided. His everchanging employment gives him every variety of motion and posture. Not a muscle but is pressed into service. His work lies chiefly out of doors. The freedom of earth and sky are his." We think there is no better way to secure and maintain this needed health and hardiness than daily manual labor on farm or in garden.

2. We give the beginning of a wide range of practice in farming, horticultural and other practical operations. In a narrow routine of labor, such as is generally practiced on any one farm, our labor cannot take the place of home drill. If a farmer were to send one son to the Agricultural College for four years and keep another meanwhile at work with himself, it is altogether probable that the home boy would at the expiration of the time be a better plowman, the better handler of farming implements and of stock. He has given his time to it, while his brother has given two-thirds of his to study, and has had his limited amount of labor divided up and shared by many things that were wholly neglected at home. The college youth would appear at first no doubt at disadvantage. It is practice that makes perfect, and there are hundreds of manual operations upon a farm that can be done well only through such practice. The same thing is true of the graduates of all professional schools; they are, so far as skill goes, behind those who have been content to secure skill only, and to neglect the scientific study that would enable them to understand the operations they have learned to perform.

On the other hand the range of objects in which the beginning of skill is acquired is very large. Not only is a larger number of crops and of varieties of plants grown at the college than on an ordinary farm, but the methods employed are more various. The comparison of breeds of cattle, the budding and grafting of trees, growing of hot-house plants, the planting and care of shade trees, laying out of grounds, treatment of forests, culture of ornamental plants, management of bees, surveying and division of fields, are some of the work that occur to me as illustrations of this wide range of work. Although this benefit of our labor taken by itself would not take the place of that drill which actual life on the farm affords, it is at least a partial recompense for the loss of it, and is of too much value not to be taken into the account.

3. By his manual labor the student acquires a working familiarity with the sciences that underlie the various operations of the farm. While the subjects of Mechanics, Chemistry, Botany, and Zoölogy are taught in the College as sciences, those who give instruction do not forget the practical application that is to be made of them to Agriculture. The selection of the topics to be dwelt on in these studies is influenced greatly by this consideration. Thus the Entomologist chooses injurious and useful insects for class study, and gives to the bee a thorough study; the Botanist in a like manner lingers long with the grasses, and with other plants which an agriculturist should know. The sciences are then pursued into their practical applications, into the construction of machinery, drainage, bee-keeping, stock-breeding, and the management of crops. Take for example the scheme of lectures on Agricultural Chemistry. It embraces the formation and composition of soils; the relations of air and moisture to vegetable growth; connection of heat, light, and electricity with growth of plants; nature and source of food of plants; chemical changes attending vegetable growth; chemistry of the various processes of the farm as plowing, fallowing, draining, etc.; preparation, preserving, and composting of manures; artificial manure; method of improving soils by chemical means, by mineral manures, by vegetable manures, by animal manures, by indirect methods; rotation of crops; chemical composition of the various crops; chemistry of the dairy. This enumeration gives the fourth part of the students' course in chemistry and its applications, running through two whole years of the course. Where during such a course of study could a student better be than at work in garden or barn or elsewhere, where the principles he had learned in his classroom should occur frequently to mind, where he should stand in the midst of Nature's operation, with a partial key to the solution of her mysteries in his mind, and where Nature should seem to be constantly putting questions to him, and reminding him that through knowledge only can he become at once her interpreter and her master? Yet this is but the course of lectures of one professor. The lectures on botany and vegetable physiology have as close a connection with what goes on around the student while at his work; the zoölogist and physiologist is also as practical, and then comes the two long courses of lectures on practical agriculture by the Professor of Agriculture. Where can the student better spend his time during this course of study than on the farm and in the gardens and orchards of the College, handling the very objects he has been instructed in, and watching the operations of Nature that he has seen described?

It is a mistaken notion that a science is learned when the text book is committed, or even when the student can write essays and lectures upon the subject. The president of a bank once told me that it took a graduate of a commercial college about two years to become competent to keep the books without oversight. You would hardly commit yourself to a ship which was to be managed by a landsman, however familiar he might be with books on navigation. Book farming is no worse than book-any-thing-else. Experience is the only schoolmaster that gives certainty to knowledge. The case is similar in the learning of sciences. A general knowledge of astronomy, geology and classification in zoölogy, such as an educated man is expected to possess, and such as is really of value to him in his conversation, his reading, and his travels, would be very insufficient for practical use. The knowledge must be made familiar.

The general propositions of the sciences must not simply be known, but enough of the individual facts on which these propositions rest must be known to make them both be, and be felt to be, the summing up of a knowledge of details. A short course of lessons never gives the mastery of principles in any science. It is only by living for a considerable period of time in the midst of the things and processes of which the science teaches that this mastery is gained. The three hours' daily labor on the farm holds students to a place where their scientific knowledge is under constant handling and review, and where it will impress itself on the memory in ever changing relationships.

4. Out of the peculiar mental training I have described comes our best hopes of an improved agriculture. Machinery is frequently invented by men whose lives are spent for the most part in pursuits very removed from the objects of their inventions. A lawyer invented the seed drill. The person who so simplified it as to bring it into general use was a college president. A clergyman invented the mower, and a teacher the cotton gin. But the principles of mechanics are comparatively well known; the circumstances that modify mechanical action comparatively limited. It is often possible from the principles known to predict the result of any combination of forces. The process of reasoning is largely what the logicians call deductive. And even here where the agents are most obscure, as in heat and electricity, the inventions are commonly made by men who are familiar with all the details of the work in hand, through every day employment with them.

The kind of discipline and habit of thought required for the advancement of agriculture is not deductive so much as inductive. The art, the science, are experimental. There are no few well known principles underlying agriculture, as the few laws of motion underlie mechanics. Many of nature's operations in plant and animal life are yet unknown, and those that are known are so combined in action with the unknown that there is but little chance for invention in agriculture like invention in machinery. There are needed for the furtherance of agriculture as a science men not only well acquainted with chemistry and animal and vegetable physiology, and with their practical appliances, but possessed also of inductive skill, ready to compare phenomena and elicit general laws of likeness and difference, apt to seize upon any suggestive change in the working of things, and qualified to experiment with it, and to interpret the results. Now, although the grand generalizers that give us universal laws are but ones in millions of the race, there is still a process of lesser generalization, and certainly of the collection of facts, without which general laws cannot be educed, going on by educated observers in all sciences and arts. Such furtherers, at least, of the science and art of agriculture, we would have our graduates to be. William Whewell has planned his elaborate history of the Inductive Sciences on the fact that men of ordinary education and skill have first to collect and establish and make numerically accurate vast quantities of facts before the general law that binds them into one, and that furnishes rules for art, can be announced. The genius appears at last, God-sent, and gives us the key to new mysteries of nature.

Agriculture especially suffers from a lack of definite facts, a lack owing largely to the intricacies of the subject, but a lack which may perhaps give way before a class of trained observers. These trained observers are now increasing in numbers, and the Agricultural College is doing some of its best work when it helps to make them,

I come now to the consideration of some of the moral uses of the labor system, and I have first to say

5. Manual labor throughout a four years' course of study inculcates the opinion and the sentiment that farm labor is not degrading, that labor and learning and culture are not incompatible. The sculptor works early and late. His chisel and hammer are not idle, and the product, when it comes to view, gives him honor. It is because there is revealed in it the superior thought-work as well as hand-work of the artist. So with the architect. Now, let the farmer's work reveal activity of mind, as well as bodily routine, let it show taste, and something of original skill, and honor will not be withheld merely because he is employed in manual labor. But when manual labor is in subjection to habit merely, when it is unaccompanied by education and culture, it will, however honorable it may be, take a low and unimportant place in the esteem of men. But here, where labor is united to science, it becomes not only not incompatible with culture, but is itself a source of culture. As the management of his work requires thought, and as curiosity is kept awake by the relationship of scientific principles with what he sees about him, his intellectual nature is quickened and its growth promoted; and so he sees everywhere a thousand beauties of form or plan or purpose that would have been unnoticed but for his education, and his taste and enjoyment are enhanced. Take for example the manifold beautiful ways in which plants protect their buds from the frosts of winter, the many kinds of stores of food for the germinating stem, or the ways in which they provide for the scattering of seeds,—these and a thousand other things lie before the uneducated, not enjoyed because not seen. But the free play of thought and the relish of the beautiful can lift hard work out of the condition of drudgery into that of honor and pleasure.

6. The College hopes to send out into the various parts of the State educated young men who shall enter upon farming as their business. We cannot of course expect to educate the mass of young farmers, as the law and medical schools might educate the practitioners in those professions. Farmers are not numbered by hundreds, but by tens of thousands. But education is a leaven whose influence permeates the mass around it. The presence of a few educated farmers in each county would not be small.

Many remedies are suggested for the abandonment of the farm by the young men of the country. The inducements to go into the professions or into mercantile pursuits are very strong with the young. It would not do for an Agricultural College to strengthen these influences by breaking up the habits of farm labor with which the student generally comes to us, and permitting a taste to be created averse to manual labor. This opinion has been the subject of ridicule, far and near, but I cannot help feeling that it is very important. The language of our catalogue seems to me to put the case properly. It says of manual labor, "The preservation of health, and the cultivation of a taste for agricultural pursuits are two other important objects. Four years of study, without labor, wholly removed from sympathy with the laboring world, during the period of life when habits and tastes are rapidly formed, will almost inevitably produce disinclination, if not inability to perform the work and duties of the farm. But to accomplish the objects of the institution it is evident that the student must not, in acquiring a scientific education, lose either the ability or the disposition to labor on the farm. If the farmers, then, are to be educated, they must be educated on the farm itself."

But this habit of labor and willingness to labor is not enough of itself to determine a student to select agriculture as his vocation. Home circumstances will often do it, as they will also determine other students to other pursuits. Something more is needed to give farming a fair chance with other callings in its claims upon the young. Will the rendering of home more pleasant by better gardens, fruits, and flowers, by shade trees and other objects gratifying to the taste, keep young men upon the farm? These things will have their influence no doubt, but on the whole the youth of our country are too noble to look for mere ease and enjoyment in their chosen vocation. They want in a business that scope and necessity for intellectual labor that shall give it dignity in their own eyes and in that of community. And when they see that agriculture has become an intellectual business, that it has sure foundations in science, and gives full exercise to college education and discipline, they will feel it to be, as it is, worthy their highest ambition, and the business will then, in return for honor bestowed, confer honor, not only on the educated, but upon the whole mass of agriculturists who shall share in the dignity that it enjoys.

Statistics show that less than one and one-half per cent of the graduates of literary colleges go to farming, and that a very large per cent of the graduates of agricultural colleges choose agriculture for a business. Some thirty per cent of the graduates of the Agricultural College of Massachusetts are farmers, and in our own State more than fifty per cent are either farmers or students or teachers of agriculture.

EXPERIMENTS AND OTHER WORK OF THE HORTICULTURAL DEPARTMENT.

BY PROF. W. J. BEAL.

[Delivered at Rockford, Big Rapids, and Mason.]

At the close of the last College year, September 1st, I was unable to report the results of some experiments which were then incomplete. I now proceed, somewhat at random, to speak of experiments and work of the department for the past year.

NOTES OF SOME TIMBER TREES IN THE ARBORETUM.

At the Agricultural College is a small arboretum of over two acres, which cootains not far from two hundred and seventy-five species of trees and shrubs, all of which are labeled and the plat recorded in a book for the purpose. At this time I merely wish to speak of some of the most prominent trees which we have planted for timber. The oldest of these were started or transplanted to this place in the fall of 1875. The soil is sandy loam and not what one would call strong. It is naturally well drained. An old road once cut the lot in two pieces. At this place the land has been graded down. There is a marked inferiority in the appearance of the trees growing on this ridge where the top soil has been taken off, showing that trees—even forest trees—are very sensitive to good or bad treatment. For example, where the top soil was taken off in a strip about a rod wide, some butternuts which had grown three years averaged about twenty-two inches in height, and one and five-eighths (1⅝) inches in circumference, while those on each side on good soil averaged about five and one-half (5½) feet in height and four inches in circumference.

How Planted, How the Size is Compared.

The seeds are planted in rows, one way four feet apart. They are planted as soon as ripe in most cases where the trees are wanted. They are kept well cultivated till autumn. In the table below and in the text it will be seen that I have given the height, circumference six inches from the ground, and the weight of good specimens cut off at the surface of the ground. By weighing them, I get at the bulk of the wood to an approximate degree.

Burr Oaks—(Quercus macrocarpa).

These when examined, had grown three years. The seeds grew only a few rods from where they were planted.

White Ashes—(Fraxinus Americana).

By the side of the oaks are three rows of white ashes of the same age, of three years' growth. The seeds of the ash came up evenly and quickly, and grew well. At the end of the first two years they were straight, clean, and without a branch, as will be seen they are large for their age. By the side of these are two rows, which, at the end of one year were transplanted. The size of these is shown in the table. Those transplanted seem to be about one year behind those not moved.

Basswood or Linden—(Tilia Americana).

These will be seen to be fully as large as the ashes. They girt from 3¾ to 4⅝ inches, and run up as high as 8 feet.

Sugar Maple—(Acer saccharinum).

The next come three rows of maples of the same age. One specimen was considerably larger than any of the others. The size is given in the table. The maples are rather uneven in size, and many are quite small.

Butternuts—(Juglans cinerea).

These come next to the maples. Some of the largest will be seen to have grown very fast for the first three years. The limbs start out about seventeen inches from the ground.

Chestnuts—(Castanea vesca).

These are rather uneven, most of them came from nuts planted where they were wanted. Some seedlings grew a foot or more in height and blasted and died in August or September. Most of them lived, however. Some were transplanted when one year old.

Black Walnut—(Juglans nigra).

These were measured when two years old, and have done well. The red squirrels took some of the nuts out of the rows where planted.

Ohio Shag-bark Hickory—(Carya sulcata).

These are all small and spindling, and the best of them only about eight inches high.

Box-elder, Ash-leaved Maple—(Negundo aceroides).

All of the trees native to the neighborhood grow along the river bottoms. They are small, short and crooked, the largest not exceeding one foot in diameter. We have some seedlings which were once transplanted when three years old.

Ailanthus.

This is tender, diseased, and will very likely soon die down to the ground.

Catalpa.

The seeds of these came from the Department of Agriculture at Washington. Since writing my report the trees have twice born fruit and prove to be the hardy species or variety. Since they came up and have made their present growth they have passed through two of our severest winters, when the mercury went 32 and 33 degrees below zero. They were once killed back a little, but at present they seem healthy. The table shows that they have made a rapid growth, although transplanted when they were three years old. I am much pleased with these trees, which have exceeded my expectation. Since making my report I have started more of them.

Red Elm—(Ulmus fulva).

I set a few small trees which have grown three years since that time. We generally think this tree grows slowly, but these have done well. One of them the past year made a growth with one of its best branches of (8½) eight and a half feet.

Silver Maples—(Acer dasycarpum.)

These beat all of the above in their rate of growth.

I am growing young trees of the Beech, European Larch, White Pine, White Oak, Rock Elm, American Elm, and many other kinds of prominent trees. These are all yet quite young.

We live in a new country still abounding in forests where there is scarcely a passing thought given to the future supply. With the increasing size and the increasing extent and number of species on trial, my interest in the subject is correspondingly on the increase. It is already one of the most interesting fields of the College farm. To enable the readers to compare the figures, I give the following summary in a

Table Showing Rapidity of Growth.

NAME.	Age.	Height. inches.	Girth, inches.	Weight, ounces.	REMARKS.
Burr Oak	3	36	1¾	3½	Not transplanted.
White Ash	3	90@96	3 @4½	16@22	Not transplanted.
White Ash	3	72	2¾	8	Removed after one year.
Basswood	3	96	3¾@4⅝	......	Not removed.
Sugar Maple	3	72	2⅝	......	Largest specimen.
Sugar Maple	3	36	1½	8	A large average.
Sugar Maple	3	18	1⅛	......	Many of this size.
Butternut	3	78	5	......	Largest tree.
Butternut	3	66	4	44	A large average.
Butternut	3	......	....	2	In old road.
Chestnut	3	43	2¼@2⅝	......	Not transplanted.
Black Walnut	2	28@43	2⅛@3⅛	11	Not transplanted.
Black Walnut	2	......	....	2	Transplanted.
Hickory	2	8	....	1-5	A large sample.
Box Elder	5	102	8	......	Moved when three years old.
White Ash	5	108	7	......	Moved when three years old.
Ailanthus	4	144	12	......	Moved as a sucker three years ago
Catalpa	6	12-15ft	8½@12	......	Moved after three years old.
Butternut	6	12ft	9	......	Moved after three years old.
Silver Maple	4	18ft	11@11½	......	Moved when one year old.

Durability of Posts set "Top end Down."

It is believed by many persons that posts set in the ground in a position the reverse from which they stood while growing in the tree, will last much longer than when set in the reverse position.

I have undertaken the following experiment to determine this matter:

I have selected a lot of sticks four feet long and cut the previous winter. Each one of these was cut in two, and all made of even length, about twenty inches. Each piece was split in two, making in all four pieces of one. Half of these posts were set in sandy land and the other half in clay land. In each case one piece is set in a position the reverse of the other.

One lot of posts is placed about 50 feet northwest of the large stone placed on the grounds by the class of 1873, the other lot is set in the northeast part of the plum orchard and west of the President's barn. In each case the row is double and runs from east to west. The posts in the north row all set with the end up as they grew in the tree, those at the south and near them are in a reversed position.

Beginning at the east the species set are as follows, in the order below named:

1, beech; 2, red maple; 3, sugar maple; 4, basswood; 5, American elm; 6, bitternut; 7, ironwood; 8, white ash; 9, black ash; 10, red elm; 11, white oak; 12, blue ash; 13, black cherry.

Vitality of Seeds.

This question is often discussed and examples are given in which the seeds are known or supposed to have been kept for many years without losing their vitality. I have begun an experiment hoping to add something to the information which we now possess on this subject. I have selected 50 seeds of each of the following named species:

Amaranthus retroflexus (a pigweed), Ambrosia artemisiæfolia (ragweed), Brassica nigra (black mustard), Bromus secalinus (chess), Capsella Bursa-pastoris (Shepard's purse), Erechthites hieracifolia (fire-weed), Euphorbia maculata (spotted spurge), Lepidium Virginicum (pepper-grass), Lychnis Githago (cockle), Maruta cotula (May-weed), Malva rotundifolia (Mallow), Oenethera biennis (evening primrose), Plantago major (broad leaved plantain), Polygonum Hydropiper (Smart weed), Partulaca oleracea (purselane), Quercus rubra or coccinea (red or scarlet oak), Rumex crispus (narrow dock), Setaria glauca (pigeon grass or foxtail), Stellaria media (chickweed), Thuja occidentalis (arbor vitæ), Trifolium repens (white clover), Verbascum Thapsus (mullein). I have prepared twenty lots of these seeds all alike. All of each lot, fifty seeds of each species, are mixed with damp sand dug up three feet below the surface, and placed in a pint bottle. The seeds are well mixed in the sand, the bottle is left uncorked and placed with the mouth slanting downwards. The bottles are buried in a row running east and west, and are placed fifteen paces northwest from the west end of the big stone set up by the class of 1873. A boulder stone is set at each end of the row of bottles. The bottles are buried about twenty inches below the surface of the ground. The acorns are placed outside of the bottles but near them.

Feeding the Leaves of Plants with Soup.

For some time botanists have known that certain plants appropriated small insects to their use by catching and dissolving or digesting their soft parts. Plants of the martynia, tomato, petunia are well supplied with numerous hairs which have glands at the tip which secrete and exude a sticky substance. Perhaps these glands take up gases from the air or dissolve and use the soft parts of insects which they sometimes capture.

Mr. H. E. Owen of the Senior class started two seeds of the martynia in each of nine flower pots. When the true or coarse leaves appeared, he protected the surface of each pot with a cone-shaped piece of lead foil. The plants were placed in the greenhouse and watered when necesssary. He made soup from a quart of water and a piece of meat the size of one's hand. The soup was applied daily with a small swab to the upper surface of the leaves of one plant in each pot. This was done from June 30 to August 1. Two of the plants were fed twice daily instead of once a day. Fresh soup was made occasionally. In all cases those to which the soup was applied were least thrifty. The soup produced dead spots on the leaves and gave them a sickly appearance. Perhaps the soup was too strong; probably the plants do not like food served up in this form.

Five pots of petunias, two plants in each pot, were treated in a similar manner. In two cases the plants to which the soup was applied were largest; in three cases they were smallest. There was not much difference in the size of the two plants in any pot which contained petunias.

Two pots of tomatoes were planted and treated in a manner similar to the above. The plants to which the soup was applied daily were smaller than those which were not thus treated. The leaves seemed much injured by the soup.

The report of these failures may be worth something. Undoubtedly the solution was too strong for the plants. If more diluted, or applied in some other way, perhaps the results would have been quite different.

Improving Onions by Selection.

We continue the experiment of improving the keeping quality of white globe onions by planting for seed only those which keep the longest in spring without sprouting. They were wintered in a warm cellar and were left there till the last of May. As fast as any of them sprouted they were removed. On the date named all that remained sound and with no signs of growing were planted for seed. This was a long time after new onions appeared in the markets of our State from Bermuda. I see no reason why we should not raise onions which will keep foreign bulbs out of the market. Two years ago I sent some seeds to friends in two different counties for trial. They are much pleased with their improved keeping qualities and pronounced the yield good and quality equal to the best.

Root Pruning Tomatoes, Potatoes, Wheat and Corn.

On two hills of potatoes of the variety known as Alpha an effort was made to keep off the tubers and also to root prune and thus cause them to set flowers and produce berries on the tops for seed. No flowers were produced.

In a short row of tomatoes which were in flower when they were transplanted into the garden, every other plant was root pruned at two different times about a week apart. The pruning was rather carelessly but thoroughly done with a spade thrust down near the plants, within five or six inches. In every case the plants thus pruned were checked in growth, the fruit ripened later, and was much less in quantity in comparison with the plants not thus pruned.

Early in spring two small beds were filled with wheat plants taken from the field. One was filled with Clawson, the other with Diehl. These were root pruned thoroughly every week and sometimes oftener. The cuts were made deep and perpendicular on four sides of the plants within about two or three inches of the center of each stool. This was kept up till the spikes or heads appeared in sight, when the pruning ceased. In one case a plant tipped over and out of the small hole where it was pruned. The dry weather and the pruning and removal, or something else, made the plants a little more backward than those in the field where they were undisturbed. The plants were set about nine inches a part each way and kept free from weeds. The soil was sandy loam,—not what I should call good for wheat. The birds disturbed it a good deal. Some of the spikes were used up in crossing the two varieties. The heads which set were long and good, except that they did not fill well. The wheat was badly shrunken.

In another place Mr. Gulley reports some of our experiments on root pruning Indian corn. In every case the root pruning as we conducted it was a disadvantage to the corn plant, as shown in the stalks and in the ears.

Hybridizing White and Alsike Clover.

An effort was again made this year to hybridize alsike clover with pollen of white clover. Mr. Charles, who was entrusted with the experiment, obtained twenty or more seeds which he is quite certain were the result of a cross of the two species mentioned.

Since the report was written, the seeds have grown and the plants appear like those of alsike clover. Probably the pollen of the alsike clover was not all removed.

Will Red Clover not Visited by Bees Produce Seeds?

For three years some experiments have been made to test this question. Three years ago some young heads of red clover were tied up in cloth sacks before any flowers had opened. A similar number of the same age were marked. The exact numbers were lost, but those heads which were kept covered produced about two-thirds as many seeds as those not covered. Very small insects may have gone into the flowers, but no bees could reach them. In 1878, eight heads of red clover of the same age were marked. Four of them were covered with muslin bags, till all were dead ripe: the rest were left uncovered. The heads covered yielded respectively, 18, 30, 38 and 41 seeds; those uncovered yielded 46, 54, 43, 57. The total seeds from covered heads, 127; from uncovered, 200. In a similar manner, during 1879, 31 young heads of the first crop of red clover were covered before any flowers opened. Only one produced any seeds and that bore seven. At the same time 31 other young heads were marked for comparison, and yielded respectively the following number of seeds: 11, 12, 2, 35, 40, 21, 3, 1, 22, 15, 15, 20, 16, 4, 29, 3, 25, 8, 15, 22, 24, 28, 41, 10, 22, 13, 18, 18, 10, 12, 10, an average of nearly 17 seeds per head.

On August 9th, 9 heads were covered before any flowers had opened. When ripe they yielded seeds as follows, 36, 51, 45, 59, 15, 26, 47, 31, 28; an average of about 37½ seeds to the head. Eleven heads which were covered yielded no seeds. The experiments of each year were made by three different trusty students. In nearly every case, the heads which were covered soon fell to the ground where they remained till ripe. This may have interfered more or less with the production of seeds.

Are Bees of any Advantage or Disadvantage to Buckwheat?

Some experiments were begun with a view of determining this question, but the grasshoppers ate holes through our netting and the dry weather killed or damaged a part of our plants. The results are not reliable.

Hybridizing Cherries.

Pollen of the cherry known as Governor Wood was used to fertilize the pistils of the cherry known as Kentish or Early Richmond. In all cases the precaution was taken to castrate the flowers and cover them with sacks before the pistils could be fertilized. Only four specimens matured. None of these germinated.

Hybridizing Raspberries.

Perhaps a dozen, probably more, flowers of the golden cap raspberry were castrated and protected till ready for pollen. The pollen used was that of the red raspberry known as Brandywine. These plants belong to two different species; one is a sucker sort, the other a tip sort. The berries set freely and all matured well. Many seeds germinated, from which we have a fine lot of new varieties.

Crossing Tomatoes.

The seeds from the cross last year did not germinate well for some reason. Ten or a dozen plants were set out. The fruit of all of them was of good shape and quite early. Seeds were saved for further trial and for the purpose of establishing new varieties. This season the Conqueror was used for the mother and Early Smooth Red as the father in making our crosses. We saved quite a lot of seeds.

Crossing Grapes.

Pollen was obtained by mail from Painesville, Ohio. This was used on flowers of the Concord. For some reason no berries matured. The reasons for sending away for pollen have been twice explained in previous reports.

Hybridizing Crab-Apples.

Both last year and this we have been successful in crossing the flowers of our wild crab-apples with pollen of the Siberian crab.

Crossing Gooseberries.

This year we obtained seeds from two crosses, using the Houghton and the Downing as parents. Since writing the report young plants have been produced.

Seedling Gooseberries.

Our cultivated varieties mostly mildew badly. Four years ago I selected berries from a wild bush which produced fruit nearly smooth or free from prickles. The seeds were planted and last year some of the plants produced fruit. This year most of them bore fruit. I transplanted them once and kept them root-pruned to hasten their bearing. The result so far is very interesting. The plants in many respects varied in a remarkable degree in size and shape of leaf, in growth of twigs, clustering of flowers, size and quality of fruit. Some were well covered with prickles, some had but few prickles, and some had no prickles. All but 15 or 20 of the best plants were weeded out. Some were very prolific of fine fruit. A lot of seedlings of the wild swamp gooseberry were also very variable and interesting.

I have crossed a lot of Clawson wheat with the Treadwell to get a grain which shall suit the farmer as well as the Clawson and the miller as well as the Treadwell.

Weevil-eaten or "Buggy" Peas.

Last year, 1878, a trusty student at my suggestion, tested some peas with the following results. They are early peas, some what mixed, of moderate size and smooth. They were raised the year before. He soaked in water for one day 50 peas which were "buggy" and 50 which were sound, taken from the same lot. They were kept damp for five days when one of the "buggy" peas sprouted and nearly all of the sound ones. Again, in a damp place in the green-house, he placed 25 sound and 25 weevil-eaten peas. After six days all the sound ones grew, and only four of the damaged seeds. On June 5th, in good warm soil, 12 sound peas and 25 "buggy" were planted. Of this lot, all the sound ones grew, and only three of the "buggy" ones. The weevil-eaten seeds produced feeble plants.

This year, 1879, from the same lot of peas 500 weevil-eaten peas were counted out and tested in ten lots of 50 each, in the green-house. By the side of these, 500 apparently sound peas were tried. All of the latter germinated except four.

The following table gives the number which germinated in each lot of 50 of weevil-eaten peas:

1st	lot of 50	12	grew.
2d	"	10	"
3d	"	8	"
4th	"	12	"
5th	"	17	"
6th	"	11	"
7th	"	12	"
8th	"	18	"
9th	"	17	"
10th	"	13	"
Total grew		130	

This is 26 per cent. Some insist on it that a test in the open air is the only sure and fair one. It may be so, sometimes, but not always, unless very great pains are taken. For example, the moles are often troublesome in our gardens, passing along the rows and taking many of the peas and sometimes nearly all. Perhaps wrinkled or very large peas of some varieties would be less injured by the weevil than those above tested.

Vegetable Seeds from Japan.

A reference was made in my last report, to about 40 varieties of vegetable seeds received from Japan. I saved seeds of all which matured them. So those which were biennial were sowed to grow seeds this year.

The cucumber did well, and much resembles the one in common cultivation known as long green. The lettuce grew large and fast, but was tough and strong when compared with several other varieties in the garden. The onions grown last year were small. This year a few seeds were saved. They are probably worthless. The white beans did much better this year than last. The balsam apple is a cucurbitaceous plant bearing a knotty fruit as large as a large apple. When ripe it bursts open and exposes a bright red pulp. In this case as in several others, we should need the Japanese to tell us how to make use of their peculiar vegetables.

The squashes were larger and better this year than last, though they are still far behind the Hubbard and the Marblehead. We raised some of the radishes which belong to the same germs as those in common cultivation. They were not tested this year. They grew fast, and were long, white and very tender. Last year they were quite strong. Last year among several lots of seeds named radishes there was one lot which produced tops quite unlike all the others. It had a suspicious look which appeared familiar. It was hardy and wintered well in the ground. This season it threw up more leaves and a tall branching flower stalk. It bloomed and went to seed. I showed it to visitors who recognized it. Here was the common burdock improved. The part above ground differed some from our weedy plant by the name above given. The leaves were somewhat smaller, the heads of flowers broader and larger, but it answers the description of a variety of the burdock. Last year I remarked that the roots were long, white and tender, but rather strong. When observing this plant I always repeated to visitors R. W. Emerson's definition of a weed, viz.: "A weed is a plant whose virtues have not yet been discovered. Every plant, probably, is yet to be of utility in the arts. There is not a plant in the whole magazine of material nature that cannot be made a power in the hands of thinking men."

Plats of Grasses, Millets, and Leguminous Forage Crops.

For the past six years I have had from fifty to one hundred and fifty species of grasses, clovers and kindred plants growing in small quantity at the Agricultural College. To help on the start I received a lot of seeds from the Kew Gardens near London. I have purchased all the new or old kinds which I have seen advertised. Many of these failed to grow, and many were not true to name. Even from the Kew Gardens I received *panicum capillare* (old witch grass) under three different names. Among new ornamental grasses bought this season the same grass comes under the name of *Eragrostis elegans*. My previous reports have contained some accounts of these plats. A lot of 115 species were sent to the Centennial Exposition. When these grasses and clovers were first started those resembling each other were placed in contiguous plats, but it was soon found that the seeds scattered from one plat to another, and there was an undesirable mixture. Now similar plants are grown with other sorts intervening. At first a part of the seeds were sown broadcast. This was a mistake. I now sow in rows about six inches apart, and by this means the desired plants can be easily distinguished and weeds removed.

The most troublesome plant or weed in these parts is June grass; the second, white clover. No quack grass has been allowed a foothold.

Among these plats are sweet herbs, peanuts, opium poppy, tobacco, Persian insect powder, several sorts of vegetables from Japan, chicory, and a great many other interesting economic plants. I am trying the effect of good cultivation on *apios tuberosa,* mandrake, and wild geranium.

These plats are interesting and instructive to my students and to many visitors, especially when accompanied by some one who understands the various kinds of plants, their history and uses. They are all plainly labelled.

I refrain from giving any specific account of these plants, as most of them have no common names, and I could not make such an account interesting to the general reader.

The Wild Garden.

Between the green-house and the site of the new botanical laboratory is a ravine through which runs a brook. Along one of the banks is a natural thicket which has been thinned, care being taken to leave at least one tree or shrub of a kind. Some flat boulders have been used to make pockets along the bank. These pockets are about a foot square and each contains a distinct kind of plant. The plants are all well labelled, and a plat made and recorded in a book. At the foot of the bank is a small pond for water plants, and by the side of this a good place for bog plants. Not far from here is a collection of about twenty of our wild vines.

Most of these plants are native to our State, but some were a gift from Harvard College, and came from various parts of the world.

In the wild garden are now growing over 400 species of plants. In most cases there is only one specimen of a kind. The garden would make a much finer appearance if we duplicated some of the finest plants and left others out altogether, but beauty is a secondary consideration.

The plants are of especial interest to those who have some knowledge of botany, and no botanist will fail to appreciate all which has been done.

In learing botany, our students need living wild plants for making experiments and observations.

The Blossoming of Indian Corn.

The following experiments were made at the suggestion of the editor of the *Scientific Farmer.* I set three students to work at the proper time. The first one reports that the tassels on eighteen hills of three varieties of corn all began to shed pollen before the silk appeared. By this he means that the pollen of a stalk begins to drop from one to three or more days before the silk appears on the stalk. The pollen continues to fall from a stalk for about eight days, some more, some less. The pollen first ripens on the top of the centre spike of the tassel, and afterwards it ripens on the side branches, finally ripening last on the lower part of the tassel. The pistils of the upper ear appear before any below. The order of flowering of the ears is from above downward. The second observer says that the silk, especially on sweet corn, often appears after all the pollen has been shed on the stalk. Of 408 consecutive stalks of dent corn, only two produced silk before any pollen was ripe. Some experiments indicate that the silk is generally fertilized on the first day after it appears. In some cases silk remained fresh four days. From these cases it appears that Indian corn is cross-fertilized with almost as much certainty as willows, poplars, clematis, or any other species where the stamens and pistils are on distinct plants.

The Effect of Pollen on Corn during the First Year.

In my previous report I gave the result of an experiment in which pollen of Yankee dent corn was exclusively used to fertilize some smut-nosed flint corn. There was not the least effect produced on the flint corn, so far as appearance was concerned. On the second year this corn broke up into many varieties. During the past year I planted near each other three hills of the following kinds of corn well mixed together, vix.: Wankesham, yellow flint, white flint, black pop corn, early Minnesota sweet, King Phillips, black sugar. Every ear showed a mixture produced by pollen from one or more of the other varieties except those of the King Phillip variety.

New Experiments in the Apple Orchard.

The following experiments were made by Mr. E. J. Rawson of the senior class, who vouches for their accuracy. For several years we have trapped the coddling moths by means of paper bands. For two or three years these bands have been made of thick carpet paper, cut in strips about six inches wide and bound about the trunk of the tree.

A man in Western New York by the name of J. Greenbaum has obtained a patent on a band made of stout paper steeped in oil and lined with cotton flannel. These bands are about three inches wide. I bought some and he sent others for trial. To compare them with the thick paper bands we placed one band of each kind on two lots of nine trees each. In one lot the paper band was placed above; in the other the patent band was above. I give the number of moths taken on each tree for two dates:

	Patent bands below.	Paper bands above.		Patent bands above.	Paper bands below.
August 24	6	5	August 24	8	6
"	3	4	"	4	4
"	4	2	"	7	7
"	8	3	"	3	4
"	1	2	"	6	7
"	5	6	"	7	3
"	7	1	"	8	6
"	2	0	"	2	1
"	7	4	"	3	0
	43	27		48	36
Total 1st catch				91	63

	Patent bands below.	Paper bands above.		Patent bands above.	Paper bands below.
Sept. 30	10	9	Sept. 30	13	5
"	7	3	"	0	0
"	8	5	"	22	15
"	13	4	"	13	4
"	16	9	"	33	21
"	13	3	"	5	2
"	8	6	"	15	5
"	9	8	"	25	15
"	5	4	"	7	12
	89	51		133	79
Total 2d catch				222	130

Grand total for patent bands, 313; for paper bands, 193.

In the above tests, then, the patent bands excel those of thick paper more than three exceeds two.

Some bands three inches wide were made of material such as is commonly used for water proof cloaks. These were tested with the patent bands in the manner above described. The test resulted in a catch of 30 moths for the patent bands to 17 moths for the cloth bands. Perhaps thick cloth or cotton flannel alone would do as well as the patent bands, but we have not compared them.

During the past year, 1879, I have repeated the experiment, comparing Greenbaum's patent bands with the bands made of heavy carpet paper, with the following results:

Patent bands below.	Paper bands above.	Patent bands above.	Paper bands below.
Caught 28 moths.	Caught 17 moths.	Caught 14 moths.	Caught 0 moths.
" 17 "	" 3 "	" 12 "	" 2 "
" 19 "	" 7 "	" 11 "	" 3 "
" 4 "	" 2 "	" 21 "	" 3 "
" 2 "	" 0 "	" 4 "	" 2 "
" 25 "	" 10 "	" 5 "	" 1 "
" 8 "	" 4 "	" 11 "	" 3 "
" 27 "	" 11 "	" 10 "	" 4 "
" 16 "	" 1 "	" 3 "	" 0 "
" 14 "	" 2 "	91	18
160	57		

Total for patent bands, 251; total for paper bands on same trees, 75.

The patent bands caught under similar circumstances a little over three and one-third times as many moths as the bands made six inches wide of thick woolen carpet paper.

This shows that the moths have some choice in selecting a hiding place. Were there no patent bands, very likely the paper bands would catch all or nearly all the moths caught when two bands were placed on each tree.

Cost of using Bands.

We not unfrequently hear objections made to the practice of placing bands around trees to catch moths. "It is too much bother," or "It costs too much in labor and money."

The bands in our climate should be placed around the trees by the middle of June, and changed every eight or ten days for nine times.

We pay our students eight cents an hour for work and they board themselves. At ordinary speed it takes one student an hour and a half to change a hundred bands once and kill the moths, or thirteen and a half hours for a hundred trees during the season. This amounts to a dollar and eight cents per hundred, or a trifle over a cent per tree. The cost of the paper and cutting it up, and replacing now and then an injured band, is about one cent apiece. Add these and we have the enormous (!) sum of a trifle over two cents all told, to properly bandage each tree for a year. As I have said before, the man who is not enterprising enough to take this trouble deserves to eat wormy apples all the days of his life.

Plaster on Apple Trees.

Mr. C. N. Merriman, of Grand Rapids, and perhaps other men has claimed that plaster or gypsum will produce a favorable result on the amount of fruit which a tree will set, that it helps the growth of the tree, and keeps away the codling moths.

We do not claim to have given this a thorough trial. Just as the trees were in flower, two trees of Northern Spy were well dusted over with gypsum. At four other times, at nearly equal entervals during the summer, the trees were dusted with gypsum.

One of these trees yielded very nearly 7½ bushels, another near by which was not so treated, 5½ bushels. In the first lot of apples plastered, there were 194 moth-eaten apples. In the second lot of apples not plastered, there were 159 moth-eaten apples. In another place the plastered tree yielded nearly 5 bushels of apples, which contained 114 wormy specimens, while the tree not plastered yielded about 4½ bushels and contained 50 wormy specimens.

Old Air-slacked Lime on Apple Trees.

This was applied in the same manner as the plaster, with similar results.

Pears, Plums, Cherries, Grapes.

Our plants of the above fruits have all done well during the past year. I will not repeat the list of varieties as that has been done each year for several years past.

We have 100 varieties of grapes, and add each year what seem to be most promising from cold climate. Forty-one varieties of grapes fruited the past year.

The Green-house and Flower Grounds, Drives and Trees.

These have been kept up in the usual manner, as well as our labor and money would allow. Some improvements have been made. The increased growth of the trees has improved the appearance of the grounds.

Teaching Horticulture.

The Juniors are taught eleven weeks by daily lecture, each an hour in length. There are many things which it is impossible to teach by lectures in such a manner that students shall fully understand them. As the course is now arranged each student is taught in the gardens or orchards far more hours than he spends in attending lectures in the class room. The out-door instruction is fully as important as that given in the class room. To pass the subject of horticulture, each student must do enough of the out-door work to merit seventy per cent of the marks for such work. The topics for this out-door instruction are as follows: if well done, each counts ten. Budding, grafting, layers and cuttings, trimming hedges and evergreens, trimming drives, cutting and laying sods, trimming apple trees, trimming grapes, fighting the curculio and other orchard insects, trimming and staking raspberries and blackberries, picking, assorting, and packing berries; picking and barreling apples; marking out and platting an orchard; taking up and setting trees; taking up and setting strawberries; managing hot-beds and cold frames; managing celery; managing seed drills, etc.; testing seeds; crossing flowers; use of hoes and weeders; fighting insects in the vegetable garden; planning, cultivating, and preparing the ground; washing and bunching vegetables; harvesting, storing, and barreling onions, roots, etc.; planning flower-beds.

To give this outdoor instruction the juniors are taken out in companies of about seven at a time. They take the tools in hand. They are shown how to work. They are criticised, and have a chance to make suggestions and ask questions. This teaching comes in the afternoon, in the season of the year most suitable for the work to be accomplished.

Until recently, this out-door instruction has never been systematically carried out at the college. The value of such instruction has always been known, and is too apparent to need arguments in a lecture like this. The reasons for not sooner inaugurating this system are as follows: The teaching force has been inadequate. It required all the time and energies of the professor and foremen to give the class-room instruction and superintend the ordinary routine of work. We still find it hard to get sufficient teaching force to do our work thoroughly and satisfactorily. Every one is expected to take up all he can possibly carry. We have to perform double duty.

Our seniors in the horticultural department are assigned to special duties for the whole year. Each has a chance to try his skill in managing work.

Making Experiments.

The question is often asked why we do not make more experiments. I answer, "Because we cannot get the money to make them." The last legislature was the first to appropriate money to make experiments in horticulture, and all that was asked was $500, and a part of this was to be used to hire a man to teach classes which did not belong to my department.

The report of the executive committee of the State Grange last December took a high stand, much above that usually taken. It reads: "We have no sympathy with the demand so often made that the college should be a paying institution, or, in other words, should return to the State in dollars, dollar for dollar, all all that it receives." J. J. Woodman, Master of the State Grange, also implies the same when he says in his annual address, "If poor Sweden can afford to spend so much for the encouragement of her agriculture in schools and experimental farms, cannot the great agricultural State of Michigan afford to be liberal to our college, and sustain one farm for experimental purposes?"

Township School Superintendent.

Through some oversight I was elected superintendent of schools for the township of Lansing. Besides examining teachers and visiting schools, I have twice met with superintendents of the several townships of the county at meetings held in Mason. We arranged for two teachers' institutes to be held at Okemos and at Leslie in November.

Granges and Farmers' Clubs.

I have served in Capitol Grange, No. 540, as lecturer, where the attendance has doubled and the interest has much increased during the past year. The meetings are held weekly, and the members number over two hundred. I have given several short lectures in this grange, but my chief work has been to induce others to write, read, and speak.

In January I was elected Master of Ingham County Pomona Grange. I have lectured or taken an active part in meetings held at Mason twice, Holt, Fitchburg, Alaiedon, Dansville, Williamston, Perry Centre. At Mason, we held a Farmers' Institute for two days, and at Dansville a harvest festival, both of which were well attended.

I took an active part at the meeting of the State Grage held in December.

Farmers' Institutes.

I lectured at institutes held in Charlotte, Climax, Flint, Mason, Hudson, and Hillsdale.

State Pomological Society.

I attended the meeting held at the State Fair and did what I could, as a member of two committees on fruits. At the annual meeting held in Paw Paw I read a paper on "Rules for Judging Apples," and another, which was my "Report of the committee on single plates of apples shown at the State Fair of 1879.

Answering Questions.

Large numbers of inquiries have been answered in person or by letter. These questions chiefly pertain to remedies for injurious insects, names of grasses, weeds, bee-plants, fruits, and the like, and they come from citizens of our State and other states, and from publishers of various agricultural journals.

FARMERS' BOYS IN RELATION TO FARMING.

BY R. G. BAIRD, SECRETARY OF THE MICHIGAN STATE BOARD OF AGRICULTURE.

(Read at Rockford, Manchester, and Romeo Institutes.)

The subject of my address is not so directly a part of Agriculture as those themes which have occupied your attention at the previous sessions of this Institute. I think, however, that it is quite as important as any of these; for no matter how successfully a man may raise horses, cattle or sheep, how much he may increase the fertility of his farm or improve the quality of his crops, his life will be a miserable failure, if by neglecting to cherish those influences in his home which are essential to the right development of character, there should come forth from that home a generation of idle, unprincipled or vicious sons, to bring swift disgrace upon themselves and exert an evil influence upon society. Happily, however, among our rural population, the homes that send forth such boys are rare exceptions.

It is my impression that a large number of the boys of the country grow up well, and as regards intelligence, real worth and the positions of usefulness and honor which they occupy in after years, they will compare favorably with the boys that are brought up in village, town or city. I have no knowledge of statistics bearing upon this matter, but am merely giving the impression that has come to me from observation both of city and country life.

All through these northern States, both east and west, you will find men occupying positions in the very front of professional and mercantile pursuits, whose boyhood was spent upon the farm.

I quite frequently notice articles in agricultural and other papers, bemoaning the fact that so many farmers' boys leave the farm, and that so few of them are content to remain at home to possess and cultivate the paternal acres. If it is a fact that the sons of farmers are less inclined than other men's sons to follow the occupation of their fathers—although I am very much inclined to doubt whether such is the fact at all—yet if it is so, I doubt whether it should be a matter of regret. We must respect the individuality of our boys if we would lead them on to the highest usefulness and best enjoyment in life. It is a stupid sentimentality to bemoan the fact that all farmers' boys do not become farmers, or to regard it as a loss to themselves and to society when they chose to "hang up the shovel and the hoe" to take hold of some other implements more congenial to them. Who is sorry to-day that Daniel Webster in his boyhood, came to the conclusion that the best way for him to hang a scythe was to hang it on the limb of a tree and leave it there so far as he was concerned. If his father, like an unreasonable tyrant, had compelled him to stick to the farm we should have lost one of our greatest statesmen and most brilliant orators, to have made in all probability a very poor farmer. In the circle of my own acquaintance there are several men who, from a mistaken sense of duty, or out of deference to the wishes of parents, or from circumstances that seemed to hedge them about and leave them no choice in the matter, have stuck to the farm, while their tastes were not at all in harmony with the occupation. It would be a mere truism to say they have not made a success of it, while I have no doubt they might have been entirely successful in some other and more congenial occupation.

Even in the same family we almost invariably find a wide diversity of organization, tastes, temperament and capability. In this diversity of gifts nature itself teaches us that there should be diversity of occupation. The same lesson is forced upon us when we look abroad upon the world's wants. Large numbers of men must be employed in other occupations besides that of producing the raw material. Government, education, transportation, manufacturing, mining,—think of these vast fields of labor in which millions of active brains and busy hands must find honorable and remunerative employment. It is the part of wisdom for parents to watch the indications of tastes and fitness and allow to the individual the largest liberty in regard to the choice of an occupation, understanding always that success does not depend upon the particular calling pursued so much as in the manner in which we pursue it, on the amount of brains and energy and enthusiasm that we bring to it.

Still it cannot be doubted that many young men have left the farm for some other pursuit, who, had their surroundings and associations in early life been different, as they might have been and ought to have been, they would have remained to find in the occupation with which they first became familiar much that was congenial to their tastes, helpful in the development of their manhood, and furnishing scope for thought and intelligence equal to any calling known to man. And now I desire to point out briefly some of the things that have contributed to place farming in a false position as compared with other occupations, and have been causes of discouragement to active and ambitious young men, leading them to think that almost any other occupation is preferable to farming.

One cause of this I have no doubt we will find in the false idea, altogether too prevalent, *that farming does not pay*, and the spirit of discontent and dissatisfaction resulting from this idea with which farmers themselves often regard their occupation.

There are men I presume in all occupations who are constitutional croakers; it is as natural for them to grumble as it is for them to breathe, and I have known farmers who, if they impressed anything sharply upon their children, it was the idea that the occupation of farming was the hardest, most uninviting and undesirable of all pursuits; that in no other branch of industry was labor so inadequately remunerated as in this. The burden of conversation in their homes is that farming does not pay. It is hard work; farmers can't afford the luxuries that other people can. There is also a constant worrying and fretting about the weather; it is too hot or too cold; the wheat will be winter killed, and the corn destroyed with frost; it is too wet or it is too dry, and you know the old saying that "a dry year frightens the people to death and a wet one starves them." Meet one of those discontented farmers and ask him how things are looking in the country, and with a remarkably sober visage he will tell you "it is the poorest season I have ever known; we farmers are having a *very* tough time; the grass is so light it will hardly pay the cutting; the wheat what wasn't winter-killed will be badly rusted, and the other crops are so backward we will have a hard time getting them harvested. Ah, I tell you farming is a dreadfully poor business."

You might as well expect that a fire would burn under water as that a love for farming would be developed in such an atmosphere of discontent. What folly to expect that the children, who have constantly breathed this atmosphere, should voluntarily choose for the business of their lives an occupation which they can think of only as furnishing an occasion for fault-finding and complaint.

Now, the fact is, as you know, farming does pay. I see men before me to-night who have demonstrated that the farmers of this township could buy up every other interest in it and still have something left for investment where they could have good security and ten per cent. The probate records all over the country show that there is no class of men who accumulate so much property as the farmers. Occasionally there is a merchant prince who has accumulated millions, but for one such perhaps there is a hundred struggling to keep their heads above water, some of whom never succeed in accumulating anything except liabilities which they cannot discharge. Taken as a class the records show that farmers accumulate the most. And yet we all know that the instances are comparatively few in which farming is made as profitable as it might be, and that in a large number of instances the profit, if there is any, is very light indeed, but in these latter cases the method, or rather the want of method, in conducting it would inevitably lead to embarrassment and failure in the conduct of any other business. What a large proportion of farm work is done in a slipshod, hap-hazard sort of way without any definite plan or purpose. When I drive past a farm-house in winter and see vehicles and implements standing around in the weather, cattle and sheep evidently poorly fed and still more poorly sheltered, and the only wood pile in the dooryard a log or two drawn up, and an ax beside them with which a block is cut off as needed, I know that there lives a man who feels quite certain that farming does not pay. Oh, how little there is about such a home and such a life to make any one love it.

Another thing that has made farming uninviting to many of the better class of young men who have turned away from it will be found *in the defective manner in which farming operations are too often conducted.*

It has been too common for farmers themselves to regard their occupations as one in which it was not considered necessary to lighten its labors by any rays of science or gleams of intelligence from the realm of mind and thought. Work has been the one thing in demand from morning till night, and with the physical nature thus overtasked to such an extent as to exclude the possibility of mental effort the mind must become dwarfed.

If there is such a farmer here, as possibly there is not, for they are not the class likely to attend a Farmers' Institute, but if there is such a farmer as shuts his eyes against the light that is bursting forth upon the agricultural world, from the progress of the natural sciences; who, realizing in his pursuit no necessity for anything but muscular energy and strength, closes the door against the innovations of science; who plods along with the fewest possible implements, and these the cheapest and poorest he can find, I hope he may never have a boy so devoid of ambition as to follow in the footsteps of his father. I am strongly of the opinion that a more general recognition of the necessity and importance of farming on scientific principles, a recognition of the scope and profitable employment which the occupation gives for the use of the powers of observation, thought and inventive genius, will do much to make the boys growing up on the farm feel that it is a fitting place for them to remain. But just so sure as they are made familiar only with modes of operation that exclude all necessity for thought, require only physical dexterity and strength, so surely if there stirs within them any laudable ambition they will long for the coming of the day that will at once free them from parental control and the monotonous drudgery of their farm life.

In so much as we do away with the drudgery—the severe tax upon the physical strength—in the work of farming, and allow time for mental activity, either by improved methods, or the invention or adoption of some labor-saving machine, by so much we elevate and render more attractive the occupation.

It would hardly be in the line of what I wish to speak of to-night to point out the very many ways in which you may make your occupation as farmers more attractive and profitable, but the men who think will have no trouble in finding a sufficient number of them in the line of invention or experiment. God has given us both body and mind, and the varied pursuits of life are designed to give exercise to both. No pursuit affords better opportunity for the harmonious exercise of all our powers than agriculture intelligently pursued,—which fact seems to declare it the best adapted for the human race, as it is of necessity the one in which the largest number will be engaged. Honor it by an intelligent culture, relieve its burdens by mental application, invention and experiment. Keep it fully abreast of other occupations in the great race of progress by readily responding to the demand for improvement in every department of your work, and the brightest, most ambitious and talented boy in your household will take up the line of progress, and cheerfully employ his strength of body and powers of mind in carrying it forward.

The idea so generally prevalent among farmers themselves and so generally acted upon, that a liberal education is not necessary for a farmer, operates as an element of discouragement to farmers' boys, making them discontented with farm life.

Boys often think more and see farther than we give them credit for. They are not very old when they begin to look around, institute comparisons and get their own ideas about different classes of men. Perhaps they have an uncle, their father's brother whom their grandfather sent to college when he was a boy, and their father stayed at home and inherited the farm. Sometimes they go to visit their uncle and cousins in the city. There is an atmosphere of refinement and elegance about their home that is perfectly enchanting to the country boys. Their cousins are able to tell them of vacations spent in travel, and of the many interesting places they have visited, and things they have seen. Their own quiet life in the country seems tame and commonplace in comparison.

Your thoughtful intelligent boy looks a little further, to see what men are filling the most important public positions, and he discovers that although farming represents almost as much capital and has nearly as many persons engaged in its pursuit as all the other occupations put together, he discovers that the control of public affairs is largely in the hands of men who represent some other pursuit than that of farming. From the cabinet and U. S. Senate, down through the wide range of civil service appointments, State and county offices, there is nothing more conspicuous than the absence of any considerable number of leading and controlling minds from among the men who cultivate the soil.

Now, I know of no class of men who should be more willing to look this state of facts in the face with a fixed determination to find the true cause of it, with a view to discover and apply the remedy, than our well-to-do farmers, whose sons are soon to inherit, let us hope, not only their farms but also their energy, industry, and steady habits.

As a class farmers are men of pretty good judgment, and they are likely to put forward and support for the high positions of trust and responsibility the men that they consider the best qualified to fill these positions without regard to their occupation in life, and what they have practically been confessing all along is that their interests and the interests of the country can be best promoted by men of other occupations. We have in this country no class, who on the assumption of aristocracy, can arrogate to themselves the power to govern ;

but I have no doubt you will find as a rule that the men chosen to fill positions in the executive, judicial and legislative departments of government are selected in the largest ratio from those occupations or professions, as a preparation for which a liberal education is regarded as indispensable. Now, if there is anything in farming which necessarily deprives the men who engage in it from becoming as thoroughly acquainted with the science of government and its application to the affairs of the state and nation as the men engaged in other pursuits, then it *is not* such an occupation as we have always considered it, and our bright and intelligent young men should be encouraged to turn their backs upon it and be congratulated when they succeed in launching out into something else. None of us I presume will admit that this is the case. I am very sure it is not the case, but practically it has been so regarded.

What would nine out of ten of you farmers be likely to do if you had two sons and one of them chose a profession and the other chose to be a farmer? The one that chose a profession you would send to the high school as soon as he got through with the district school. After spending three or four years there you would send him to college or to the university, where he would take a four years' course. Here we shall say are seven years after leaving the district school in which he has been having the thorough discipline of study without any reference to a professional course afterward. With all the development of mental power which these years of discipline have given him, he turns his attention to law, theology, medicine, engineering or some specialty connected with the natural sciences. No matter what the specialty to which he may turn there can be no doubt of his success, so far as mental discipline is a factor in the securing of it. If he were a boy of good health and fair ability to begin with, behold what a power he is fitted to become! The foundation has been well and truly laid and we shall expect to see a noble structure rise upon it. We expect to see as the result of this mental discipline and liberal culture a man likely not only to succeed in his chosen avocation, but who will also be able in any emergency that may arise to marshal his powers to meet the demand, as a general would his army to concentrate them upon the enemy. In the meantime how is it with the other boy who is to be the farmer? He goes to the district school, perhaps a short time to the high school, and here and there is one who goes to the Agricultural College long enough perhaps to get some idea of botany and chemistry and such studies as bear directly upon agriculture. That would be considered by most men a specially good education for a farmer. On the part of many, any education not bearing directly upon agriculture would be regarded as so much time lost. These ideas are practically held and acted upon even by the more advanced class of farmers, and from this very cause it is as difficult to eradicate the idea that farming simply means labor, as it is to destroy a patch of Canada thistles. "The fault, dear Brutus, is not in our stars, but in ourselves that we are underlings." I hope the day is not far distant when it shall be regarded as equally important that the boy who inherits the farm and chooses agriculture for his occupation should have the advantage of as liberal an education as the boy who chooses a profession. Then and not till then will agriculture hold that predominant and commanding position in the affairs of the state and nation which rightfully belongs to it. Then and not till then will it maintain the ascendency and the honor with which it was originally crowned, when the "Lord God planted a garden and there he put man, whom he had formed, to till it and dress it."

I do not suppose that you all agree with me in some of the positions taken in these remarks, and perhaps some of you would like to ask a question, which I will ask for you, and try to answer as best I can. You want me to give my opinion as to whether a young man who receives such an education as I have been advocating will be as likely to take to farming as he would have been without the education? Well, candidly, under present circumstances I do not think he would, and yet I think the educated young man would be much more likely to take to farming to-day than he would have been ten or twenty years ago, and I think that in less than twenty years to come the farmer who has a boy that he expects to inherit his farm will see to it that that boy has at least as good an education as any of the boys in the neighborhood who are going to fit themselves for the professions of theology, medicine or law; and that the question then will never be asked in regard to whether such an education would be likely to prevent him from becoming a farmer. It will be regarded as sufficient that he needs it *as a man*. If to-day a young man is less likely to become a farmer because he has been liberally educated, it is not the education that is at fault so much as the erroneous ideas that prevail both in regard to education and farming. In all the past history of the race it has been expected that education would create and develop a distaste for labor. The educated man must not soil his hands with work or degrade his intellect with the ordinary affairs of life. The idea that an education is to enable a man to make labor productive of larger and better results is a comparatively new thing under the sun. It is but of yesterday, and not only farmers, but a great many people who are not farmers, have yet to be educated up to it. Last winter I gave a lecture at one of our Institutes in which I said considerable in regard to this aspect of an education. At the close of one of our meetings a young man came up to me and expressed his approbation of what I had said in regard to education enabling a man to labor more intelligently and effectively. I found on talking with him that he had just graduated from the University of our own State, first in the literary department and then in the department of engineering, and said he "I have come home to be a farmer, and my neighbors seem to think that if I will stay on the farm all the time and money spent on my education is so much thrown away, but I mean to teach them that they are mistaken before I get through," and I should judge from his appearance that he is quite competent to do that.

Whatever may be the effect of a liberal education upon our young men, this one thing is very evident, that many of our educated men who are not young and who have been eminently successful in their respective callings, develop as they grow older a strong liking for agriculture. I need not point out to you individually the many eminent statesmen, lawyers, merchants, physicians, railroad superintendents, lumbermen, bankers, editors, and even clergymen, who to-day are taking an active interest in agriculture, and who are really doing more for its advancement than any other class of men. One has a fancy in the direction of a fine horse and he makes a specialty of the improvement of that noble animal; others like the firm of Avery & Murphy, undertake the improvement of Short-horns, and import into our State some of the best Short-horn blood in the world. The late Gov. Crapo did the same for the Herefords. Others, as Hon. Wm. Webber, Judge Marston, and many others, are doing the same with different dairy breeds. Another, like Hon. A. B. Maynard, takes hold of a miserable place that he has told us could raise nothing but "mullein stalks and mortgages," and he makes it one of the most productive farms in the county of Macomb. The late Senator Chandler, when in Europe a number of years ago, became much interested in the reclamation of what is known as the Harlem flats from which the sea has been shut off by a dyke or wall, and the water, not drained, but lifted and carried off by pumping,—and he said to himself, if this land can be made so valuable, why cannot land in Michigan be made valuable where the water will take itself off if the ditches are dug for it to flow in? and so he undertakes to solve the problem of the value of our marsh lands. Subsequently, Judge Miller, of Bay City, has dried some seven or eight hundred acres of marsh by dyking and pumping, a large portion of which is now under crop. Our average farmer is very much mistaken if he thinks he can afford to laugh at these men as amateurs. They are doing a grand thing for agriculture; they are solving problems that have been too long unsolved,—they are just the class of men, and they are doing just that kind of work which is going to make farming more inviting to our young men than it has ever been before. I know of no class of men who, by the influence of their example are doing so much to persuade our youth from the exciting bustle and tempting pleasures of the city, to the moral, safe and happy influences of a rural life.

Young men, it will soon devolve upon you to make choice of an occupation in which you are to find the work of your life, and whatever you do for your own good and the good of the race to which you belong, will be mostly if not exclusively in connection with that occupation. Among the occupations that invite you, farming stands revealed as one which is more and more drawing toward it men of unquestioned ability and of the broadest culture. And those of you who, by your tastes and opportunities may be led to choose agriculture as your life work, will be as likely to find here, as in any other calling, a rich reward for honest manly work of head, and heart, and hand.

OUR PATENT SYSTEM.

BY PROF. R. C. CARPENTER.

[Read at Buchanan and Mason Institutes.]

Although but one person in three thousand, on the average, applies each year for any kind of a patent, yet the patented process or machine is employed so largely in every industrial pursuit that a knowledge of the character of the monopoly created by the patent is not without some value to every person. The frequency of swindling operations, in connection with the sale of patents or patent devices, has, within the last few years, thrown the whole patent system into disrepute with the people generally. In many instances the people have found it impossible to defend themselves from extortionate demands of patentees, under the existing patent laws. Often the lawful claims of the patent right agent are for devices from which there has been no "value received," and which appear for this reason more like swindling than legitimate business operations.

Thus, in the patent case of the Birdsell clover thresher, royalty was collected of every person who had ever owned or worked any other kind of a clover thresher. Perhaps not one of these men knew anything in regard to the nature of the patents owned by Birdsell; they bought and used other machines, on the supposition that they infringed the rights of no person. In many of these cases, as a matter of fact, it was not known by any person for years after they had quit threshing that every other clover machine was an infringement on Birdsell's patent. Yet on the principle that "ignorance is no excuse," even though it be an utter impossibility to learn, these men were held equally liable with the manufacturers, and forced to pay a large royalty.

The frequency of such cases of flagrant injustice has created a strong feeling which, in some places, is expressed in favor of a complete abolishment of the entire patent system, and in other instances contents itself with a demand for reform.

That organization which represents the great mass of our farmers—the grange—has clearly demonstrated, during the past year, the great value of organization and co-operation to the people in meeting such issues as are created by the patent laws. The grange saved the farmers of this State many thousand dollars by organizing the people and fighting the unjust patents on the slide gate. The people, thus organized, propose to do more; they propose to act, not only in this State but in every State, in such a way as to induce Congress to make some desired changes in the patent laws. The changes thought to be needed are specifically stated, and thus their demand is made to differ from those senseless cries of general fraud, and those meaningless demands for reform with which our land has been filled the past few years.

The object of this paper is not to advocate the changes desired by the farmers; neither is it to defend our existing patent system. Its object is, rather, to give information in regard to the present patent laws, and of the monopoly created by a patent.

The origin of all patent laws is generally supposed to be the English statute of James I. (1625), which in terms destroyed all monopolies but allowed the crown to grant inventors rights to exclusive use, for a short period, of new inventions, or new processes of manufacture.

There is little doubt but that our early systems were copied from the English to a great extent. Previous to the adoption of the constitution, the different States had repeatedly, and to a considerable extent, granted patents. This practice led to an endless amount of confusion and injury to industries.

Thus the State of New York granted to Robert Fulton, in 1803, the exclusive right of using the steam-boat within its limits, for the term of twenty years; and in 1808 extended this time to thirty years. The State of New Jersey granted this same patent to another inventor. The result of this action was to prevent New Jersey steam-boats from coming to New York, and New York boats from passing over New Jersey waters.

By the terms of the constitution, adopted in 1788, the right of giving patents to inventors or copyrights to authors was conferred on congress. One of the first laws passed by congress after the adoption of the new constitution was the patent law of 1790, which was amended in 1793; again in 1800, after which it was not materially changed until 1836. Previous to 1836 there was no distinct organization known as the patent office, but the power to issue patents was given to the secretary of state, jointly with the attorney general. The act of 1836 created the patent office, and put an officer, the commissioner of patents, at the head of it. This officer, although appointed by the president, is under the supervision of the secretary of the interior. He is charged with the duty of examining all applications, in order to ascertain their novelty and utility, and for this purpose is allowed numerous assistants. The term of the patent was limited at first to fourteen years; afterward the commissioner was allowed to grant an extension of seven years, making the total life of a patent twenty-one years. In 1861 the power of extension was taken from the commissioner for all patents granted after that date, and the term of a patent was put at seventeen years. In 1870 the patent law was revised and put into the form now in practice. This revised law describes the duties of the various officers connected with the patent office, and states what shall be the salary of each. It also states the requirements for a patent, and methods to be pursued in case of appeal, interference, or infringement. It describes, with much fullness, all matters relating to the duties of inventors or of the public with respect to patents, and with rulings on doubtful points, from the United States circuit and supreme sourts, determines the practice of the patent office in respect to all matters connected with the granting of patents.

The patent system, in some form, is adopted by most European nations. Switzerland and Holland are the two prominent exceptions. In all of these countries the system differs from that in the United States, and in no two countries do we find the same system. By special treaty most of the countries possessing patent systems grant the same privileges to the citizens of our country as to their own in respect to patents, and the same privilege is accorded by our government to the citizens of other countries.

OUR PATENT LAWS.

The following is a brief summary of the laws of the United States in regard to patents, together with some remarks regarding their practical application:

The law provides for the employment of one commissioner and assistant, sixty-six examiners in three grades, 108 clerks in four classes, one librarian, one machinist, and such other clerks as may be needed from time to time. On account of the various and exceedingly numerous applications for patents the examiners are divided into various classes, which are defined on the basis of the subject matter of the patents. The work of any one examiner is usually confined to a single class, and consequently he is in ignorance, to a greater or less degree, of the nature of the patents granted in another class.

WHO MAY OBTAIN A PATENT.

Any person not an employé of the patent office, whether citizen or alien, whether a resident of this or a foreign country, who is the first discoverer of anything patentable, may obtain letters patent therefor.

The object of the law is to give to the original inventor the exclusive right of ownership of his invention for a limited time, and consequently it provides means for the sale or assignment of any patent or any portion of a patent.

The law regards as the inventor him who has first reduced the invention to a practical form. He can employ for this purpose, without debarring his rights as an inventor, skilled mechanics from whom he may receive suggestions of great value. The idea, however, must emanate from him. He who merely conceives an invention, without reducing it to actual practice, is allowed no credit by the law.

WHAT MAY BE PATENTED.

"Any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement thereof."

By art is meant a mode, manner or process of doing a thing; by manufacture, any product of industry, not including machines. By machine is meant a function or mode of operation expressed in the form of mechanism and designed to accomplish a certain effect. If the mechanism is new, the effect may be new or old; if the mechanism is old, the effect must be new. The invention may embrace the entire machine, or parts of it, or it may embrace a new combination of old parts, in which case the combination as a whole must produce a new effect.

In all cases the inventor must state, in his application for a patent, the nature or principle of his invention in such a manner that a person acquainted with the terms used could reduce the information given in the letters patent to practice. He must also distinguish between what he believes to be new or old in his invention. This information is technically known as "the claims." The application is then referred, under our system of classification, to an examiner having this class of matter particularly in charge, and who is supposed to know what is new in this especial class. As a matter of fact, the examiner usually undertakes to ascertain only whether what is claimed as new obviously infringes on any patent previously granted in his class. If the applicant is not satisfied with the decision of the examiner, there is a method of appeal to other officers of the patent office, and finally to the Supreme Court of the District of Columbia. If he is successful in this the patent finally issues.

INFRINGEMENT.

In order that the patent may be of any value, there must be remedies to prevent *infringements*, and measures to redress injuries done by infringers. The patent law provides that the United States courts shall have jurisdiction over all such cases, and power to grant injunctions and to assess damages. The United States court is also made the final judge as to the legality of any patent that may be called in question, whether as to its infringement on some previous patent, or as to its having been granted for an invention not original with the patentee.

The question of infringement is frequently a very complicated and difficult one to decide, and it is not unfrequently true that the decisions of one court are reversed by a higher court. Most of the cases brought before the courts are those in which one patent is claimed to infringe on another. Any person using, manufacturing, or selling, without permission from the owner of the patent, any patented contrivance, is liable to be prosecuted in the United States courts for damages, which may be made to cover not only all the profits made by the infringing party, but all damages the complainant has sustained thereby. All suits for damages, however, must be brought during the term for which the patent was granted, or within six years from the expiration of the patent.

SPURIOUS INVENTIONS.

The object of the patent laws is to secure to the inventor the value of his own invention, and consequently the law provides that if at any time it can be shown that the patentee was not the original inventor, and that the invention had been in use more than two years previous to the application for the patent, or had been patented in some foreign country or described in some printed publication, the United States court may declare the patent void. Thus in the cases decided last year against farmers for infringing on the Teel patents on the slide gate, the value of the patent was destroyed by showing that it was not an original invention with Teel.

REISSUES.

Under the name of *Reissues*, the law provides that any patent, which for reason of defective or insufficient specifications, is invalid or inoperative, may be re-stated under such restrictions as are supposed to guard against fraud. Usually the model deposited in the patent office is regarded as sufficient evidence of the original invention to determine whether or not a reissue is deserved.

MARK REQUIRED.

The law provides a penalty of $100 to be paid by any person who falsely marks an article as patented, one-half of which shall go to the informer. The law also requires all patented articles to be marked in such way as to call attention to the fact that the article is patented, and provides that unless this is done, no damages can be collected for unlicensed use, unless the use is persisted in after a notice of infringement has been given.

TRADE MARKS.

The patent law also provides for the protection of trade marks; but this portion of the patent law was declared by the supreme court of the United States as unconstitutional, during one of its sessions in 1879; consequently it is in its present form not operative. Trade-marks are, however, protected by decisions in common law, and to secure exclusive use of a trade-mark a patent is not necessary.

STATE LAWS.

The decisions made at various times by the U. S. Courts have settled the question that State laws which impose any restrictions upon the sale of patents or the collection of royalty for infringement, are invalid. Thus, in this State, a statutory provision requires that all notes given for patent rights, to be of any value, must indicate for what they were given; but in a case exactly the same in one of our neighboring States, the U. S. court decided that such restrictions were unlawful, and the law requiring them was not valid.

It must be carefully understood that all changes in the patent laws or restrictions upon the sale of patents, must be made by congress.

NUMBER OF PATENTS.

The patent office is one of the few governmental institutions that pay; although in its offices, courts and corridors, are an immense number of employés, yet it will be found that its income exceeds its expenditures by about $100,000 per year. The number of applications for patents is nearly 22,000 per year; the number of patents granted about 12,000. The total number of patents granted by the United States to date are about 200,000. These patents are granted for inventions of varying merit. The great mass of the patents are on insignificant things. Out of the 200,000 patented inventions, there are probably not to exceed 100 inventions of such value as to revolutionize, to any considerable extent, the practice in any particular department.

In order to show the number of patents given on certain subjects, the following table was compiled:

TABLE.

Subject.	No. of Patents.
Adding machine	7
Advertiser device	14
Air brake	6
Animal trap	24
Augur, earth	6
Axle attachment, lubricators, etc.	60
Baby jumper	3
Baby holder	13
Bale tie	54
Baling press	18
Band cutter	3
Barrel attachment	36
Bed bottom	43
Bedstead	37
Bee hive	33
Boot and shoe	87
Butter stopper	60
Broom	16
Brush	37
Buckle	29
Burial cases	11
Bustle	1
Butter packer, marker, etc.	21
Button	47
Car axle	17
Car brake	25
Car coupler	56
Carpet cleaner	3
Carpet stretcher	4
Carpet sweeper	6
Cabs, baby	11
Churn	92
Clothes dryer	13
Clothes pin	4
Clothes powder	12
Clothes wringer	6
Coffee pot	10
Corn sheller	15
Corpse cooler	3
Corpse preserver	1
Corset	40
Cotton gin	10
Cultivator	76
Curtain attachment	34
Drill	25
Draft attachment	22
Egg carrier	23
Electric light	10
Farm gate	9
Fence	71
Fence post	36
Fire alarm	72
Fire escape	72
Folding chair	16
Fruit, dryer and packer	44
Gate	64
Grain binder	30
Grinding mill	22
Harness	30
Harrow	57
Harvester	71
Hay rake	35
Hinge	36
Hog cholera compound	14
Horse power	24
Horse shoe	25
Ironing bench	17
Knitting machine	21
Lamp	148
Ladder	25
Lantern	31
Latch	32
Lifting jack	40
Loom	40
Lubricator	30
Corn marker	4
Milk cooler	13
Mower	18
Nut lock	40
Padlock	14
Paper bag	20
Plaster composition	72
Plow, etc.	212
Potato digger	13
Printing machine	25
Pumps	134
Railroad switch	24
Refrigerator	40
Rock drill	18
Rocking chair	27
Saddle	32
Sash fastener	23
Scale	36
Sewing machine	150
Spark arrester	15
Separator	57
Stove	170
Telegraph	46
Telephone	23
Thill coupling	32
Threshing machine	13
Type writers	12
Valves, steam	20
Vehicle spring	57
Velocipede	18
Ventilator	12
Wagon brake	28
Wagon rack	14
Wash board	18
Washing machine	84
Water closet	36
Wheelbarrow	6
Wind mills and engines	36
Wrench	12

Although it is noticed that among this list of patents are many relating to important machines—for instance on the cotton gin were ten patents, sewing machine 150, electric light 10, etc., etc. Now, it must not be supposed that by this we mean that 150 different sewing machines were brought into use;

far from it. These patents were given for small and often insignificant improvements, and in some cases might all be attached to a single machine, although it is extremely doubtful if more than one would prove of any value.

The preceding sufficiently indicates the principles of our patent law, from which it is seen to be capable of guarding all rights of inventors, and one might even think it would afford them pay proportioned in amount to the value of their invention. It would even seem to afford the people protection from imposition, for it gives them the right to test the validity of any patent in the courts. If they believe a patent to be an undeserved privilege, they have only to prove it and the patent will be revoked. The question which is now before us is whether, in its practical workings, the system is as beneficial as the carefully drawn out laws would indicate. That our patent system is popular with inventors is well known to everybody; in fact, the patented article is omnipresent—it is everywhere. It is in our boots, it is in our clothes, it is in the tools we work with, in the buggy we ride in, in the harness on the horse, in the whip we strike him with. It is to be found in our fences, in our gates, in our pumps, in our kitchen, in our food, and finally in our coffin. We may suppose that we plow our land with a plow that pays the inventor ten per cent; we drag it with a harrow that pays him twenty per cent; we sow our grain with a drill that pays him fifty per cent; we reap our grain with a machine that pays him 300 per cent; we pitch it with a fork that pays him ten per cent, on to a wagon that has paid fifteen per cent; and finally have it threshed with a machine that has paid fifty per cent; and the straw delivered and preserved in a patented manner for which we pay fifty per cent more. Such is, in effect, our patent system. It has woven around us a system of taxation more complete than was ever devised by any minister of finance. We are taxed by the use of patented inventions, from the time we enter this world until we leave it; even then our body is consigned to the dust in a coffin or casket which, ninety-nine out of one hundred times, is not free from some patented device.

INVENTORS NOT ALWAYS PROTECTED.

Although our patent system is so popular with inventors, yet it is a fact that it does not always afford them protection; indeed, when the invention is of any great importance, the history of the past shows that frequently the true inventor receives little or no pecuniary benefit. This was true in the case of Fulton, the inventor of the steamboat; Goodyear, the inventor of the process of hardening rubber; Whitney, the inventor of the cotton gin; Ericsson, the inventor of the screw propeller and the famous monitor; and many others. Their machines, though of vast importance, generally were complex, and the patents were easily avoided. Our patent law is, however, more successful in affording protection to inventors of small and specific things, such, for instance, as the drive-well, the lock-stitch, the corset, and a thousand and one insignificant things. These inventions frequently form the basis of a large fortune. This much is usually true: that the money received from a patent depends not so much on the value of the invention as on the business talents of the inventor. The

COST OF PATENTED ARTICLES

is usually largely in excess of the cost of manufacturing. This seems to be always true in such cases as the lock-stitch of the sewing machine, where one patent controls all known methods; but usually, as the old saying is, "There is more than one way to skin a cat"—more than one method of producing the same result. In such cases patented machines come into competition with each other, or with machines not patented. The result often is that the patented and better machine is the cheaper of the two. The case of the American watch is exactly as described. Although the patented machine may cost much more than the cost of manufacturing, yet this much is true: that if that machine have a permanent market, its products must be either cheaper or better than those produced in the old way. Thus with the sewing machine; we could afford to pay three times their cost rather than be without them. In the mowing machine and the reaping machine the same thing is true in a less degree. We feel we must have them, although it is probably true that they save us more time than money, if such a thing is possible.

PATENTS THAT CAN PAY NO ROYALTY.

There is another class of patented articles that will not sell if any royalty whatever is added to the cost of manufacturing. This class forms the most dangerous class we have, especially when the article is easy to manufacture, for the reason that the patentee, finding it impossible to realize any money from his invention lets it lie dormant. In a few years, perhaps, it goes into general use. Then he finds collecting royalty a profitable business, even though it may be a thankless one. This was especially true in regard to the inventions known as the "slide gate" and the "drive-well." Though we were successful in defeating the patents on the slide gate, we were equally unsuccessful in regard to the drive-well. Neither of these inventions will stand a royalty. Their merit is not much greater than those articles previously in use, and which they to some extent superseded. This class of inventions is the one which most frequently lays us open for infringement.

PATENTS ON INSIGNIFICANT INVENTIONS.

No one can deny that many of the inventions, perhaps all true inventions, confer upon the world much benefit; and in most instances, despite the royalty to be paid to the owners of the patents, it is not economy to be without them. This is certainly true in regard to the mowing machine, the sewing machine, and a great many other inventions with which this last century has been blessed. The question which is before us to-day is one which deals with all classes of patents—not merely those great inventions which have revolutionized the practice of the whole world, but rather with that multitude of devices which, under the name of inventions, make up the principal patent business of to-day. The great mass of the patents are granted for new applications of old devices. In some cases the application is so novel and striking as to be worthy the name of an invention, as when the idea of cutting grass with a tool shaped like the saw, which had been in use for years for cutting timber, was suggested and carried out in practice by Ogle of Scotland. But such an application is not any more patentable than that of transferring the filter made of solid brick from the cistern where it had long been in use, to a well where it is made to serve the same purpose. There is hardly a person here who would call that last an invention. It hardly merits the name of an idea. Yet it is a fact that within ten years, a patent has been granted to a person—a resident of this State—for the application of the common brick filter to wells. As the case now stands, if you build a cistern and construct around the pipe from your pump a brick filter you will not be molested, but if you put exactly the same mechanical contrivance into your well, you will be liable to prosecution and may have to pay a bill of damages.

The great bulk of the patented devices of to-day have no more of the spirit of true invention in them than that just described. There are now and then exceptions to this general rule—"kernels of grain, as it were, in a huge pile of chaff"—devices into which the true spirit of invention has crept, and which are well worth to the world many times what they will cost.

The methods of granting patents for any novelty that may be originated must, from its very nature, include many worthless articles. Indeed, it is claimed that out of 100 patents granted, 99 usually prove worthless.

PATENT NO INDICATION OF VALUE.

People have learned practically, and in many cases to their cost, that a patent is no indication of the value of an article. How frequently in the past have farmers been led to believe that some patented contrivance for loading hay, husking corn, or digging potatoes was all that could be desired, and how eagerly have they invested in a town or county right for selling that patented article. Can you, however, mention an instance when such a proceeding has proved of pecuniary benefit? The farmer finds to his sorrow, and usually also to his indignation, that his patented contrivance is of no value whatever, and the glowing future pictured to him by the smooth-tongued agent, when wealth should roll to him without effort on his part, to be a myth, with no existence in reality.

THE SLIDE GATE.

Not only does the method of granting patents extend to worthless articles, but, in spite of the efforts of the examiners, it is often made to include articles which are not new. An illustration of this is painfully familiar to some of us in the recent suits for infringement on the Lee and Teel patents on the slide gate. Although the history of those prosecutions is generally well known, still I feel that I will be pardoned for calling your attention to a concise history of them. For most of the facts in this case I am indebted to Mr. H. D. Platt, of Ypsilanti, the representative of the people in the defense of the users of the slide gate.

In June, 1878, Bickford & Co., of Ypsilanti, purchased of a firm in Cleveland, Ohio, the patent taken out by John C. Lee, Oct. 24, 1865, on a field fence and gate combined. The drawing of the patent granted, as shown in the patent office reports, is given in Fig. 1.

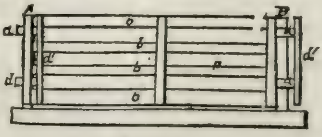


FIG. 1.

The following description was also given in the patent office report:

> "This invention consists in the combination of the gate with the posts and fence, one of the said posts being slotted to receive the ends of the panels of the gate when closed. Claim—The arrangement of the panel or gate F in combination with the mortised post B, post A, strips *d'*, slats *d*, as for and the purpose set forth."

In the construction of this gate the slats *d*, *d*, are fastened to the posts (Fig. 1). On the end of each of these slats is nailed a strip, *d*, which is not connected with the ground. The gate is opened by sliding partially back over the slats nailed to the post A, and then turning one-fourth around. Mr. Lee claims that the drawing does not show his invention fairly, and that the slats *d, d*, and strip *d′* should be omitted, giving a form of gate as shown in Fig. 2, which is copied from a model made by Mr. Lee.

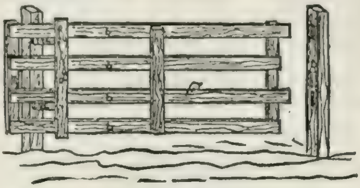


Fig. 2.

Bickford & Co. appointed agents, furnishing each with a model of a gate similar to that shown in Fig. 3, and which did not possess a single point as claimed in the patent granted Lee.

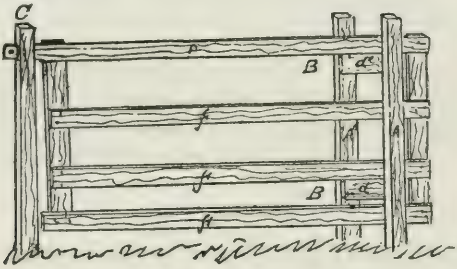


Fig. 3.

They demanded of every farmer using a gate like that shown in Fig. 3, a license varying from $4 to $15, depending on the size of the farm. If payment of this license was refused, a notice of infringement was served and a prosecution in the U. S. courts threatened. To avoid suits many licenses were purchased, and the amount collected in the counties of Washtenaw, Wayne, and Livingston was considerable. On good authority it is stated that $5,000 was collected in Livingston county alone. The members of the Ypsilanti grange, suspecting that all was not right, appointed committees to see Mr. Lee, and also to learn what was patented by him. Mr. Lee was very willing to aid the farmers, and his statement convinced them that they were being swindled, and that they were threated with a claim which had no existence in reality. Mr. Lee describes his invention on oath before a justice of the peace, as follows:

The State of Ohio, Medina County,—ss.

John C. Lee of Seville, in said county of Medina, being first duly sworn, says that letters patent were issued to him numbered 50,605, dated Oct. 24, A. D. 1865, for an improvement in a gate, known as the two-post gate, and that my improvement consisted in the dispensing with one post and the cross slats, and in the use of a strip perpendicular with the post and slats running parallel with the gate; and further saith that the two-post gate was in common use in this county at the time my patent was issued to me; and further, this affidavit saith the facts stated in this affidavit are true, as he verily believes.

JOHN C. LEE.

Sworn to by the said John C. Lee, before me, and subscribed by him in my presence; and I further certify that the said John C. Lee is well known to me to be the person he represents himself to be.

CHAUNCEY SPEAR,
Justice of the Peace of said county of Medina.

October 31, 1878.

A public meeting was called and an organization of farmers, called the Mutual Defense Association, was perfected. The patent changed hands about this time, and from this date the farmers were prosecuted by Dale, Bagley and Root. Forty-four suits were begun against members of the association (with one exception), all of which were dismissed without trial, after the plaintiffs had made the defendants all the cost possible. In a single case they supposed and actually did have an infringement on Lee's patent. They were defeated, however, by the defendants, who showed the use of the gate more than two years before Lee's application for a patent, and further that Lee's was an infringement on a broader patent given to A. C. Teel, Dec. 1, 1863, and reissued July 20, 1867. The owners of the Lee patent, by making active efforts, were abte to purchase the Teel patent, or at least the State right of that patent.

Fig. 4 is an exact copy of the drawing of Teel's gate, published in the patent office report for 1863, and the following is the description and claim as allowed by the patent office:

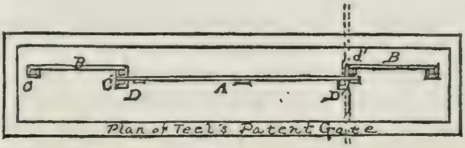


Fig. 4.

"No. 40777.—A. C. Teel of Girard, Macoupin Co., Ill.—Improvement in farm gates.—Patent dated December 1, 1863.—This panel of fence is to hang upon strips attached to the neighboring panels, that it may be pushed in half the length of a panel and then swung one-quarter round so as to make an opening the length of a panel. Claim—The suspending of the gate A on strips d, d′ attached to posts C D C′ D′ at the ends B B of the fence, substantially as shown, to admit of the sliding of the gate and the turning of the same for the purpose of opening and closing it as herein set forth."

The figure shoes only the plan of the gate, and one letter, C, is evidently misplaced, but dispite this the patent secures to A. C. Teel all the essential features of the slide gate. Fig. 5 is an isometric drawing of Teel's patent gate with the letters C and C′ in their proper places.

As previously stated, when an inventor can prove that the specifications do not cover his whole invention, the patent office allows him to restate the specifications, under the name of a "Reissue." A reissue does not extend the time of the patent, but after it is once granted its specifications replace those of the original patent. July 2, 1867, A. C. Teel took advantage of this law and obtained a "reissue," of which the following is an exact copy:

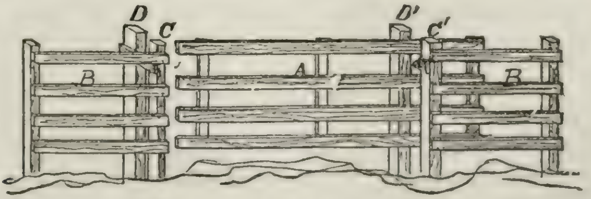


FIG. 5.

"2667.—A. C. Teel, Girard, Ill.—Farm gate, patented December 1, 1863; reissued July 2, 1867. Claim—First, the hanging or suspending of a gate in such a manner that it will have a combined sliding and swinging movement in the opening and closing of the same, the gate sliding from a closed position or state to a central balanced state, and then swinging while in a state of equipoise to an open position, and closing from an open position by swinging around in a line with the gate-posts and sliding to a closed state, substantially as shown and described. Second, the placing of the gate-posts C′ D C′ D′ in such a relative position with each other, and constructing and hanging the gate between them as to admit of the opening and closing of the gate, substantially as herein set forth."

In the reissue there are two claims independent of each other, and an infringement on either claim or both claims may be prosecuted. The first is given without reference to a figure, and covers all cases of gates that open by sliding back to a balanced position and then swinging open. The second refers to the peculiar arrangement of posts shown in Fig. 4 and Fig. 5 (a mistake in the second claim makes it read posts C′ D C′ D′, for posts C D C′ D′—this is not material however.)

As there could be no doubt regarding the question of infringement on this patent, the defenders next undertook to collect testimony of its use earlier than 1859. In this they were very successful, and were able to prove, in at least fifty well authenticated cases, that the slide gate had been in use for more than twenty years. The persons owning this patent pushed two suits to a conclusion against infringers. The defendants carried the day, however, by clearly proving that A. C. Teel was not the inventor of the slide gate, and that he had no right to the patent which had been granted him.

These cases in regard to the slide gate, although resulting fortunately for the farmers, were sufficient to show them clearly the danger to which they were subjected.

THE DRIVE WELL.

The case of the patent on the drive well has been tested in neighboring States several times. In every case the court has decided in favor of the patentees. There are two valid patents on the drive well—Green's patent, given in 1868, which covers the well itself, and Suggett's patent, given in 1864, which covers the method of driving the well.

The history of the patents in regard to the drive well may be concisely stated as follows: the first patent was given March 29, 1864, and is described as follows in the patent office report:

"No. 42,126.—James Suggett, Courtland, N. Y. Pump for Bored Wells. March 29, 1864. This invention consists in the employment of a perforated pipe, having a tapering point at its lower end. A stuffing of cotton, tow, or other material which is easily extracted, serves to exclude the earth during the descent of the hollow rod. It may be combined with any suitable pump. Claim. The perforated pipe, with the pointed end, constructed as a drill and united with a pump, all substantially as shown."

This patent evidently covers the method of constructing a drive well, when a perforated pipe, with a pointed end is used as a drill and connected with a pump.

Oct. 24, 1865, a second patent was granted to Lieut. B. Mudge. This patent is described as follows:

"No. 50,614.—Byron Mudge, Courtlandville, N. Y. Mode of sinking wells. 24, 1865. This invention consists in driving a pointed rod of iron or steel perpendicularly into the ground, withdrawing the rod, and inserting a pipe of nearly equal size in its place, which completes the well. Claim. The process or mode of constructing or sinking wells when no rock is to be drilled, viz.: driving a rod down to and into the water underground, withdrawing it and inserting a pipe into its place, substantially as described."

Mudge having constructed a drive well under the direction of Col. N. W. Greene, in 1861, considered himself the original inventor. Consequently he surrendered his patent, and demanded a *reissue* which should cover all that had been granted Suggett. Meanwhile Col. Green put forward his claims as the original inventor by an application of what is known as an interference. The first decision, made by the commissioner of patents, was favorable to Green and Suggett, but unfavorable to Mudge. The case was appealed to the supreme court of the District of Columbia, which, after hearing much testimony, sustained the decision of the commissioner. This decision sustained the patent of Suggett, repealed the patent granted to Mudge, but gave a patent covering the same subject to Greene. Nearly two years were used in this investigation, and it was not until Jan., 1878, that the patent was issued to Greene. This patent is described as follows:

"73425. Nelson W. Greene, Courtland, N. Y. Constructing Artesian Wells. Jan. 14, 1868. Claim. The herein described process of sinking wells, where no rock is to be penetrated, viz.: by driving or forcing down a rod to and into the water underground, and withdrawing it, and inserting a tube in its place to draw the water through, substantially as herein described."

A number of bitterly contested suits have been brought into the United States court to test the validity of Green's patent. In every case the decision has been favorable to the patentees.

The first suit was commenced in the eastern district of New York in 1872, and continued four years, during which time 3,000 pages of testimony were taken.

Another suit was carried to completion in Minnesotá in the years 1877–8, with the same result.

It has also been before the courts of the western district of New York and of New Jersey. The last suit was finished in a court in Indiana in 1879. In all of these cases the patent has been sustained.

It is to be noticed that a license from Greene alone, to use the drive well, still leaves the user liable for a royalty to Suggett. This should be borne in mind, for Greene's agents will soon appear in every locality, and will not only demand royalty for old wells but will solicit orders for new drive-wells. So far as I can learn, Suggett has no agents collecting royalty, but it is well to be cautious. Now after these patents have been allowed to lie dormant for eleven years or more, and the wells have become to be used extensively, under the supposition that they were covered by no patents, it certainly is somewhat of a hardship to find ourselves liable for royalty to two inventors, and perhaps to three or four.

NO LAWFUL REMEDY.

The question at once arises: What remedy is there for this? And it is a difficult question to answer; for, in the "eyes" of the present patent law, the demand for license for use of the drive well is a just one, and it is doubtful if we can avoid paying it. It will do no good to pull up our wells, even if it would pay. The fact is, we have been swindled; that is, we have had those wells put down supposing them to be different from what they are. For this our patent law provides no remedy. The only possible protection from such unjust demands is to be found in so changing our patent law as to make manufacturers alone liable. We should demand of our congressmen, or our senators, that this change be made. It is of vital importance to our interests, and to the interests of the public generally. There is no valid reason why a limited class, known as inventors, should be given privileges of this character, without any compensation whatever for the public. In the case of the Lee and Teel patents on the slide gate, the law provided for the people a remedy against unjust demands. These patents were really given for old things, and when this was proved the patents were declared void. Even in such cases, when the demand is unjust even in the eyes of the law, the application of the remedy is frequently attended with more expense than to submit to the unjust royalty demanded. Thus in the case of the Lee patent, the license fee demanded of each farmer was but $5 or $15. Although the farmer might believe and even know that the collection of that fee was not lawful, yet if he resisted the payment it was certain to cost him many times the amount demanded—that is, the law provided a means of escaping an unjust payment of a few dollars by expending as many hundred dollars. This is the practical remedy for injustice offered by the law. It is a remedy to be tried by men who are plucky rather than discreet. It is a remedy that individuals can hardly apply without financial ruin. By combination of interested parties the payment of the unjust license fee was, in the gate case, successfully resisted. Mr. H. D. Platt, of Ypsilanti, and several others, spent much time and money in perfecting this organization. The cost to these men was largely in excess of the license fee; but their pluck, backed by aid here and there, saved the farmers of Michigan many thousands of dollars. A law-suit is the only remedy provided by the law. Legally it may be all right, but practically it is inoperative. It is no remedy at all, in cases where the license fee is small. Again, the law does not permit the party who pays the license to convict the agent of criminal action so long as he serves papers which show the patent as actually granted. This, again, subjects the public to danger of extortion; for, although the drawing and patent specifications may be exactly copied, in many cases its exact nature could be determined only by an expert. Thus take the case of the Lee gate. The only figure of this gate given in the patent office reports is given in Fig. 1, and the patent is described as follows:

> No. 50,605.—John C. Lee, Seville, Ohio. Field Fence and Gate combined. October 24, 1865. This invention consists in the combination of the gate with the posts and fence, one of the said posts being slotted to receive the ends of the panels of the gate when closed. Claim. The arrangement of the panel or gate F, in combination with the morticed post B, post A, strips D, slats D, as and for the purpose set forth.

Now suppose a farmer served with such a printed notice, containing cut and all, and explained by a wily agent. Do you suppose he would be able to discover that that patent was given only for a peculiar combination of slats and strips, together with a gate sliding over supports fastened to a single post? Rather he would be inclined to take the word of the agent, that the patent covered all cases of sliding and turning gates. The fact is, the law leaves to the public the practical decision of what is and what is not an infringement. It says, in effect: "You were shown in black and white the exact truth and the whole truth in regard to the patent, yet you allowed yourself to be deceived by the spoken words of an irresponsible party. You alone are to blame for this foolishness, and must reap the consequences." Now I would like to ask how much protection to the public is afforded by such a practice? Considering the state that the patent drawings and specifications are in, no one but an expert can judge, with any degree of correctness, on the exact province of a patent. Yet here is a case where a man with no experience is called on to decide. The result is that the shrewd agent can often convince him that his patent covers the exact tool or device in use. Swindling is a name which expresses but feebly the nature of such an offense, and for this our admirable patent law provides no practicable remedy. It is true it allows the citizen to ward off the agent, by the payment of the heavy costs of a law-suit; but it still leaves the agent free to practice his profession on some one else. The extent to which this practice may be carried is frightful to contemplate. We are liable to be called to pay unjust tribute for using rail fences, swing gates, ox carts, bob-sleighs, plows, mowing machines, and every device or machine in use. What can we do? Our swindler is not liable for prosecution, or, at least, cannot be criminally convicted, and to resist his demands is more costly than to submit to them. This fact should also influence us to demand of congress that manufacturers alone be made liable for infringement.

REISSUES.

The granting of reissues is another source to which can be traced many unjust demands. The reissue as a matter of fact is a restatement of the original specifications of the patent. It is supposed to be allowed only in those cases, in which the specification was so stated as to deprive the inventor of a portion of his actual improvement. As a matter of fact the reissue is granted when it can be shown that any device appears in the model which does not appear in the specifications. This may appear as necessary to secure to the inventor his whole invention. It simply looks like giving him power to correct errors made in describing the original patent. From another standpoint this appears in a different light. It looks as though the inventor had found out after receiving his patent that he could make more money, or at least could prevent the patenting of some great invention had he worded his specifications differently. In most cases this latter view is the correct one, and it is a fact that most of the patent litigation comes from reissued and not original patents. This was the case with the Teel gate patent. It is extremely doubtful if the original patent in that case would have covered the ordinary slide gate. The reissue, however, leaves us no room for doubt. The reissue of worthless patents has often been a source of trouble to honest and conscientious inventors. As an illustration we will cite a case familiar enough to inventors. A man, we will suppose, after many years work has produced a machine which is in every way a success. Before applying for his patent he searches the patent record and finds that the only patent recorded is on a worthless machine. He secures his patent, purchases costly machinery, and commences the manufacture of his invention. The successful machine comes to the notice of the inventor of the machine that was a failure. Although his machine would not work and the machine of the other inventor does work, yet he can see some points in the two machines in common. These points were not put in his original specifications, as he did not consider them of any importance, although they were shown in his model. These points may be nothing more or less than arrangement of machinery or details in the frame. In a case like this referring to a planing machine, it was a square bar in the frame. He obtains a reissue including all the points of his old model that are common to the successful machine. He then commences suit against the successful inventor for infringement, and demands damage, not only for such machines as are in process of manufacture, but for all those that have been made. More than that, he sends his agents over the whole country, collecting royalty whenever and wherever they can find a machine in use, for our patent law makes the users of a patented invention liable to equal damages with the manufacturer. This is the principal service to the country that is rendered by the right of reissue in the patent cases; and the question before the public is whether or not this privilege of reissue should be extended to future patents, or whether, in view of its effect in the past, it should be denied altogether. From one point of view it certainly is not an injustice to say that if an inventor does not know what his invention really is at the time of receiving his patent, he should be debarred from all privileges not claimed. This it seems to me, is the only business way that can be adopted. In rare cases it may act unjustly, but under such a rule, the great mass of the people will be protected from unjust demands, and the reverse of this is true now.

SIMILARITY OF PATENTED ARTICLES.

Another source of complaint has arisen from the worthlessness and similarity of the patented contrivances. This complaint has arisen from the practice in the patent office rather than from any defects in the law. Originally it was the intention that the patent office should grant its patents only after such an examination as should determine whether or not the patent granted was an infringement on any previous patent. Such is yet the intention of the law, and, so far as possible, the practice of the office. It was found, however, that the number of patents granted soon became so great that no single person could examine them all. This, of necessity, led to a subdivision of the examining work into classes, which have been from time to time increased as the business has increased.

This increase of business is shown in the following table taken from the patent office reports:

YEAR.	Applications.	Caveats Filed.	Patents Issued.	Surplus of cash received above expenses.	Cash expended above receipts.
1837	....	....	435	....	$4,217 90
1838	....	....	520	$4,721 44	....
1839	....	....	425	2,716 49	....
1840	735	228	473	....	964 16
1841	847	312	495	....	12,253 86
1842	761	391	517	5,264 20	....
1843	819	315	531	4,538 85	....
1844	1,045	380	502	6,264 53	....
1845	1,246	452	502	11,680 49	....
1846	1,272	448	619	4,105 45	....
1847	1,531	553	572	21,232 84	....
1848	1,628	607	660	8,670 85	....
1849	1,955	595	1,070	3,036 54	....
1850	2,193	602	995	6,816 10	....
1851	2,258	760	869	8,821 68	....
1852	2,639	996	1,020	16,739 43	....
1853	2,673	901	958	....	11,342 38
1854	3,328	868	1,902	....	3,357 52
1855	4,435	906	2,024	36,919 02	....
1856	4,960	1,024	2,502	....	7,343 00
1857	4,771	1,010	2,910	....	15,450 08
1858	5,364	934	3,710	10,522 42	....
1859	6,225	1,097	4,538	35,663 74	....
1860	7,653	1,084	4,810	3,531 79	....
1861	4,643	700	3,340	....	84,137 47
1862	5,038	824	3,521	32,944 60	....
1863	6,014	787	4,170	6,179 15	....
1864	6,932	1,063	5,020	11,051 98	....
1865	10,664	1,937	6,616	74,592 50	....
1866	15,269	2,723	9,450	133,941 10	....
1867	21,276	3,597	13,015	7,318 60	....
1868	20,420	3,705	13,378	52,886 07	....
1869	19,271	3,624	13,986	206,715 03	....
1870	19,171	3,273	13,321	112,370 57	....
1871	19,472	3,366	13,033	118,121 38	....
1872	18,246	3,090	13,590	34,135 03	....
1873	20,414	3,248	12,864	12,012 79	....
1874	21,602	3,181	13,599	58,989 76	....
1875	21,638	3,044	16,288	21,795 65	....
1876	21,425	2,697	17,026	105,445 05	....
1877	20,308	2,809	13,619	119,190 23	....
1878	20,898	2,755	12,935	132,292 66	....
1879	....	....	....	....	....

The result of this subdivision has been to give the power of determining what is and what is not patentable to various men; consequently no fixed standard of importance of the invention could be maintained, as the ideas of the examiners must of necessity differ.

Again, this subdivision into classes is accompanied with another evil: the examiner, for instance, in the class of mowing machines has no idea of what has been patented in the class of railroad switches, or in the class of buggies. As a result of this ignorance he may allow a patent for a mechanical device applied to a railroad switch, for which a patent has already been granted as used on a buggy thill and which for that reason is not a patentable article. Considering the immense amount of business performed at the patent office, it is extremely doubtful if this can wholly be remedied.

PATENT LAWYERS.

This evil is intensified by the action of the patent lawyers. Their pay usually depends upon their getting a patent; they work on the principle no patent no pay. In order to procure the patent they bring into play every influence, dishonest or honest, that they can bring to bear upon the examiners. If the patent is rejected in one class they try for a patent on the same mechanical device in another class, and with another examiner; if rejected in that class they try another class until finally the desired patent is granted by an examiner who happens to have no such a device in his class. As showing what is promised we append part of an advertisement of a prominent patent firm:

> Patents obtained for mechanical inventions, compounds and trade-marks, in United States, Canada and Europe. Caveats, assignments, interferences and all cases arising under the patent laws, promptly attended to. Inventors who desire to have their applications granted with the least possible delays should place their business in our hands, as we guarantee satisfaction or no pay. We make preliminary examinations free of charge, and our reports as to patentability of inventions submitted to us can be relied upon. For inventions which other attorneys have failed to obtain patents we invariably get allowed without much trouble. All correspondence strictly confidential. We refer to the Second National Bank, Washington; Hon. Ellis Spear, ex-Commissioner of Patents; Hon. Sam. Randall, Speaker of the House of Rhpresentatives; Hon. J. T. Power, chief of warrant division, treasury department; the several officers of the U. S. patent office; the royal Swedish, Norwegian and Danish Legations at Washington; and to members of Congress from every State. Address ——, Washington D. C. ———.

If there is any meaning to this statement, and the references attached would make it seem of some weight, we must infer that dishonest influences control our patent office.

Mr. J. H. Raymond, a noted patent lawyer in Chicago, says this—(p. 111, Patent Arguments):

> "I should like to notice, because I think the time has come when it should be noticed, and noticed very severely, the issue of patents out of the patent office for the most insignificant things in the world; and not only for the most insignificant things in the world, but the most insignificant things in the world are sometimes patented two or three times. Within the last six months I applied to the patent office for a patent on a peculiar device, and reference was given to a patent for the same device in an attachment of thills to a wagon, constructed in exactly the same manner, without any qualification, and producing exactly the same results. I prepared a brief and sent it to the examiner. I was then referred to the use of the same thing in the same way in a sulky for a race course. I prepared a brief, sent it to an examiner in another class, and received a patent."

It is hardly necessary to state that such a course as pointed out tends to destroy the value of a patent, as well as to demoralize the practice of the patent office.

OUR PATENT SYSTEM VALUABLE.

There is little or no doubt that the patent system has on the whole been of much benefit to this country. This much is certainly true, that no country in any age or in any clime has been so prolific with valuable inventions as this. Next after this country must we rank England, a country possessing a patent system even more liberal than ours. I am not prepared to admit what has often been claimed that our advanced state of civilization, the prosperity of our manufacturers, our commerce itself, all depend upon the existence of the patent system. Neither am I fully convinced but that we should have possessed the most valuable of our inventions, even had we no patent system. It is not, however, probable that our country would have possessed all those great inventions which have so nearly revolutionized our manner of living during the last fifty years, had she no patent system. No matter what may be the enthusiasm of the inventor, no matter how much may be his desire to benefit humanity, he does not look forward cheerfully to a life of poverty and possible starvation. He desires pay for his work and is not willing to work without some incentive. Were there no patent system in existence, his only incentive would be the gain from secret manufacturers. He would work with closed doors as did Guttenberg with the first printing press. No one knows how many secret inventions have been in successful operation during the life of the inventor, only to be lost entirely to the world upon his death. No one knows how much earlier the light of civilization would have spread over the entire world had every invention been made for a limited time the absolute property of the inventor. It is certain that in the ancient past were buried many valuable inventions which were not made public, and for ages laid dormant.

It is plainly to be seen that our patent system is of benefit, not only to the inventor, but to every citizen of our country. But as usual with every good thing, there are some bad ones; with the sweet comes the bitter. The evils of our patent system have been, I think, quite fully pointed out. Now let us not, I beg of you, unduly magnify these evils. Do not decry the whole patent system because swindlers have been able to abuse the power granted by that system. Because the old laws have a few defects do not conclude that they have no value and demand an entire new code. Rather should be demanded the amendment of the present laws where time has shown them to be defective. The patent law has no business to exist if it protects swindlers at the expense of honest men—if it grants protection to spurious inventors, and renders the whole country liable for damages for the use of articles which are not new inventions. These evils have crept into our patent law, and the people may rightfully demand their correction. Happily this can be done without destroying our patent system. And since the rights of every citizen depend upon these corrections, it becomes the duty to unite in demanding that they shall be made.

ECONOMY IN FARM MANAGEMENT.

BY F. A. GULLEY, FOREMAN OF HORTICULTURAL DEPARTMENT.

[Read at Manchester and Mason Institutes.]

Economy in farming means good farming. But what is good farming?

Agricultural books and papers tell us that good farming means keeping good stock, applying large quantities of manure, tile-draining, rotation of crops and doing everything well.

These things may or may not constitute good farming; good in this case means successful, making money at the business. I take it if a man is adding to his wealth, either in money, stock, or increasing the value or productiveness of his farm, he is a good farmer; if not, a poor one, no matter whether he raises Short-horns or scrubs, cultivates well or poorly.

I don't believe in the much advocated high farming unless it will pay better than a poor style of farming. We must modify our methods to suit our various circumstances; what would be best for one would mean failure for another. We cannot make any one set of rules for all farmers to follow.

But, says some one, there are certain general principles that underlie the whole system of profitable agriculture that we may adopt and modify to suit our needs. So there are, but we may reduce them all to one, and it will apply to any business. It is, make yourself familiar with your calling by every possible means, paying especial attention to the surrounding circumstances that may influence your business, and then do that which pays, and leave that which does not. Men who have traveled over Europe, especially England, come back and tell us that as farmers we are way behind our English cousins; we do not use so much manure, cultivate so thoroughly, nor get half the yield per acre.

They tell us the English farmers are sending half way around the world for guano and phosphates, and are buying bones for fertilizers, and oil cake and cotton seed meal to feed their stock to make rich manure, from our farmers, and make money by using them notwithstanding the great cost of transportation.

We are told that the life blood of our agriculture is being absorbed in the exportation of our grain and fertilizing materials, and that we must feed out more of our grain and keep everything that will enrich the soil at home or we will soon be bankrupt.

Again the farmer is referred to the truck growers or garden farmers, and shown how they grow enormous crops by heavy applications of manure and thorough cultivation, and told if he would be prosperous he must do likewise.

Our farmers do not grow as large crops as do the Englishmen, nor cultivate so well as our own gardeners. So advanced a system of cultivation would not pay in ordinary farming; we can only improve our methods with profit to a certain extent. It requires less judgment to know how to increase the productiveness of our farms than it does to know how much we can increase it to secure the greatest profit. It depends on the value of the land, and of the crops to be grown, cost of labor and of marketing the produce.

The market gardener on high priced land can afford to expend an hundred dollars or more for manure and cultivation on one acre of land, for the crop will sell for enough to pay expenses and a profit besides; but if he were to sow wheat or plant corn, the crop would not sell for enough to pay one-half of the expense of growing. Therefore I say, we can only improve our methods to a certain extent with profit.

In the August and September numbers of the Scientific Farmer for 1879 is an exceedingly valuable article by Mr. J. B. Lawes, of Rothamstead, England, on "Is higher farming a remedy for lower prices." Mr. Lawes has been carrying on a series of experiments on a large scale for over 30 years on a variety of crops, some with no manure, others with large or small quantities of either barn-yard manure or concentrated fertilizers, or both together. It is in fact the most valuable series of experiments the world has known, and probably no man is better qualified to give advice on this subject of high farming. He believes the English farmer can carry high farming only so far and have it profitable, and proves it by his experiments, which are pretty conclusive. He could make his wheat average about 30 bushels per acre without an extravagant outlay for manure, but when enough manure was applied to grow 35 bushels or more the increase in crop would not pay for the extra manure. The same principle held true with other crops.

High farming means applying large quantities of manure and growing great crops. Suppose we take a field that without manure will produce 20 bushels of wheat to the acre, and that an application of ten loads of manure, worth five dollars, would increase the yield to 30 bushels, with wheat at one dollar per bushel, there would be a gain of five dollars by the operation, or the manure would be sold for one dollar per load. If ten more loads, or twenty in all, were applied, the second ten loads would not give as much increase as the first ten, but would perhaps increase the crop five bushels, just enough to pay for the manure. If now twenty more loads of manure, or forty in all, were applied, the latter application would not increase the crop a half bushel for each load and would be applied at a loss, so far as the present crop is concerned. These figures are of course only approximate, but the idea is applying or expending a certain amount in manure will return a fair profit; as we go beyond that amount the profit will be proportionally decreased till finally the cost of the manure will not be paid by the increase in crop. The more valuable the land and crop grown, and the greater the amount of labor required, the more we can afford to invest in manure, other things being equal.

I believe in better farming, feeding stock and making manure, thorough cultivation, etc. I believe farmers must do all these things, but they must understand their business well, and expend carefully and cautiously to make higher farming profitable. They will have to rely mostly on their own judgment. No man writing a book or paper in New York, Chicago or Detroit, can tell you how best to manage your farm. Reading books and papers, learning what others have done, will suggest many new and valuable ideas, will make a man think, and is therefore of great value, but after all a man must rely mostly on his own judgment.

One farm will need one style of treatment, another something different; we can hardly imagine anything that varies more than different soils. Each farm requires a certain management to produce the greatest profit.

The outlook for the coming farmer in this State is a bright one; but to prosper, he must be an intelligent, thinking man. You remember there was a time when the stupid boy of the family was kept at home to work because he didn't know enough to be anything but a farmer, and his brighter brother sent to school and educated for some profession. There is going to be a change, and the boy who is not smart enough to take up some profession cannot hope to succeed as a farmer.

True economy in farming means taking advantage of everything that will be a benefit, and letting alone those things that are not profitable.

On most farms there should be some way of making manure, but there are farms where it may not be necessary. In New York State, Mr. George Geddes, who many of you know is the agricultural editor of the New York Tribune, has a farm, and on some of the fields no manure except the droppings of animals from occasional pasturing, has been applied for 40 years. Yet these fields have always yielded good crops, and been increasing in productiveness, so that now they produce from 30 to 40 bushels of wheat, and from two to three tons of hay per acre. The fertility has been kept up and increased by dressings of plaster, growing clover and occasionally plowing a crop under. In talking with a gentleman last winter who had been traveling through some of the Western States, he said he had visited a farm in Minnesota where they had just harvested the twentieth successive crop of wheat, and the yield was 25 bushels per acre. I am told there are farms in this State, in the River Raisin bottoms, that have been cropped for 25 years without manure and now yield 60 bushels of shelled corn to the acre. Now these are not examples of high farming; they are what is called the impoverishing system, but you can readily see that they are profitable. It is possible that light applications of manure on such land would be a good investment, but it is doubtful if feeding stock on such farms to make manure would pay, so long as the land will produce such large crops. I don't believe in giving a strong healthy horse condition powders, nor in going to great expense to manure land that will produce good crops either naturally or by growing clover, where land is worth no more than most land in this State.

We hear a good deal about the necessity of putting back on the land in manure what is taken off in the crop. The soil is compared to a grain bin, and the idea is that if we keep taking out without putting none in it will soon be exhausted and, to keep up the fertility, we must replace as much as we take out. Manuring land profitably is not really furnishing food for wheat, corn, or whatever the crop may be; it is only giving the crop, or rather the soil, a stimulant. The great bulk of what the plant takes up from the soil must be in the soil already stored up in some form or other. We can't put into the soil what the crop takes off and make anything at the business; the materials in the manure would cost as much, or more, than the crop would fetch, at present prices.

We could not take a perfectly barren soil and grow a paying crop by applying manure. I know that often land that is too poor to grow a profitable crop can be made profitable by applying manure, but the crop does not all come from the manure; there must be a good deal of fertility in the soil, and the added manure gives the plant a start so that it may throw out roots to reach matter that is in the soil, and it helps to put that matter in shape so that the plant can take it up. We have no such thing as a perfectly barren soil; even the poorest and lightest sand contains a large amount of plant food, but it is in an insoluble condition, the plant can't get it; we put on manure; it furnishes some food for the plant and renders soluble a much larger amount of plant food that is already in the soil.

It requires a good deal of study to tell how best to get out what is in the soil. In England they use large quantities of the superphosphate of lime as a fertilizer for the turnip crop, yet the turnip contains but a small amount of the superphosphate, but does contain considerable potash. It is found that applications of superphosphate of lime render soluble the potash in the soil, which may account partly for the value of superphosphate when applied to this crop.

As the majority of farms in this State do not have such an inexhaustible store of accessible fertility stored up ready for use as the farms referred to, most farmers are obliged to resort to some method of enriching their soil to grow good crops.

There are three ways: 1st, by the use of clover and plaster; 2d, by feeding stock and making manure; 3d, by the use of the commercial fertilizers, guano, superphosphate, bone dust, etc. I shall speak of the first two only.

CLOVER.

It is well settled that on nearly all soils the growth of a clover crop, whether we feed it off on the ground, cut it for hay or for seed, or plow it under, leaves the land richer or more fertile. Wheat, corn, potatoes, all do better when preceded by a clover crop. Yet, chemical analysis shows that a crop of clover takes off more of the valuable manurial elements in the soil than almost any crop we raise. Clover being one of the large leaved plants is supposed to receive a large amount of its nourishment from the atmosphere, the roots run down deep and have the power of corroding or decomposing the materials in the soil and absorbing them, much greater than other ordinary crops; there is a large growth of roots in the upper ten inches of soil, and in these roots during the growth of the plant will be stored up a large amount of plant food. From testing to see what amount of clover roots is left in the ground after cutting a crop of hay, it has been found by digging up patches a yard square and twelve inches deep in several places in a field, carefully washing the roots and weighing them, and then estimating the amount on an acre, that rich ground would yield from four to eight or more tons.

These roots are rich in plant food, and contain enough manure to grow a good crop of wheat or corn. Now in the process of rotting which these roots undergo when broken up with the plow, they decompose a large amount of the insoluble materials in the soil making them fit for plant food, the decaying roots leave little openings through the earth that admit air that also tends to decompose matter in the soil, and the earth is left loose and will therefore retain moisture longer, and will be in better condition to promote the growth of other plants. If a large growth of clover is turned under with the roots, still more manure is furnished for the succeeding crop.

On farms in a good state of cultivation where stock are kept, it will not often be good economy to plow under a heavy crop of clover. It is worth too much for feed, and if the manure made by feeding the clover is put back on the land, there is not a very great loss in manurial matter.

It is often stated by practical farmers that pasturing the clover does not have so good an effect on the land as to let it mature for hay and take off the hay. It is also sometimes stated that the land will grow a larger crop the next year if a crop of hay and crops of seed are both taken off.

In most farm crops the ripening of the seed or fruit is very exhaustive on the soil. If we cut off a wheat crop at or before the time of blossoming, the land will not be run so much as it would if the wheat were allowed to mature. In allowing clover to ripen its seed this does not seem to be the case, and it may be accounted for perhaps by the greater accumulation of roots left in the soil to decay when the clover is allowed to make the second growth in the latter part of summer. The larger part of the leaves drop off and are also left to enrich the ground. For the same reason it may be more beneficial to the land to take off a crop of clover hay than to pasture the field during the early summer, even when the stock are kept continually in the field and all the manure produced from the clover returned at once. Keeping the clover fed and tramped down would prevent a large growth of roots, which might be a greater loss than would be made up by the droppings of the cattle or other stock.

There is undoubtedly considerable land in this State the productiveness of which may be continually increased, for the present generation at least, by applying plaster and growing clover two years out of every five, even if one or two crops of hay, or one of hay and one of seed are taken off.

The application of from 60 to 100 pounds of plaster per acre to young clover has a wonderful effect on its growth, and this small amount seems to do as much good as when more is used. But the great majority of accurate experiments, not only in this country but in Europe, show that plaster is of no particular benefit to corn or grain crops. It will make them grow ranker, of better color, make more straw and stalks, but carefully repeated experiments time and again, with but few exceptions, do not show any increase in grain.

Why plaster is beneficial to clover and not to the grains or cereals I will not attempt to tell you. So long as the ablest chemists can't agree on the question, it is not worth while for us to take it up. The fact that it is so, and not why it is so, is what most concerns us.

Land that will grow a good crop of clover can be relied upon to produce other crops, but at the present time there is great complaint that clover seed will not catch. This is owing to a variety of causes, but usually to bad management. We may lay it down as a general rule that the finer the seed the finer must be the particles of the soil and the more loose must be its structure to cause germination and growth. The finer varieties of vegetable and flower seeds will not grow at all in ordinary ground. The soil must be made fine and mixed with mold, fine rotted manure, or something of the kind to keep the soil loose. Wheat or oats will grow readily where clover will fail. I have observed that garden soil when fertilized with manure in which clover straw from which the seed had been threshed out was used for bedding that clover would come in from the seed left in the straw so thick and strong that it was almost impossible to clean it out. In the garden are the three necessary conditions for the growth of a small seed like that of the clover: 1st, a fine soil made so by thorough cultivation; 2d, a loose soil by reason of the decaying matter, manure, etc., in the soil, which also keeps it moist; and 3d, it is rich, and as soon as the seed throws out a rootlet it finds food in such condition that it can take it up. Furnish these three requisites and there will be no difficulty in making cloverseed grow in ordinary seasons. Many farmers have grown from two to five crops of wheat or other grain in succession and then find clover will not catch. Several grain or cultivated crops in succession without applying any manure will sometimes use up a large part of the vegetable or organic matter in the soil. The ground looses its life so to speak, and is heavy and lumpy; it does not work up fine, and a seed so small and delicate as that of the clover, even if it sprouts, dries out and dies before it can get any nourishment, and this may happen when grain will grow readily.

Some of the best farmers always sow clover with their wheat no matter if the next crop is to be wheat also, to furnish vegetable matter to plow under, and they are not troubled by clover not growing. It is sometimes advisable to turn under some green crop to restore vegetable matter to the soil to cause clover to germinate. Oats and peas mixed make one of the best green crops.

On weedy land I would use buckwheat, being careful not to let the seed ripen. I would in nearly all cases prefer using a green crop to a clean summer fallow. The majority of farmers in this State, to keep their land in condition to produce clover and grain, will have to grow less wheat, more clover and corn, feed stock, and make manure.

It is a settled fact that manure, whether of animal excrements, or remains, guano, superphosphates, ashes, green crops plowed under, or any material that adds plant food to, or renders soluble that which is in the soil, adds to its productiveness. Practical experience has shown this for years, but all the science of chemistry, the most careful experiments and practical experience for centuries has not been able to give us any formula or set of rules telling us how we can get and use fertilizing materials with the greatest economy and profit. It is the most difficult question in modern science, a problem so intricate that if we attempted to solve it by algebra we would not have letters enough in the alphabet to represent the unknown quantities.

We all know that the manure from stock will give us larger crops, but the question is, will the crops be enough larger to pay the cost of the manure and leave a profit. It sounds well to talk of feeding stock, but the farmer works for the dollar, and if feeding stock will not pay then he does not care to try it.

As we read of the countless herds of stock grown in the far west on land that is almost as free as the air we breathe, or when bought costs but a dollar or two per acre, when we realize that those cattle can be grown to maturity at a cost of from one to five dollars per year, and shipped to New York almost as cheaply as from Michigan by reason of railroad competition, we may well hesitate before taking up stock feeding.

I doubt if we can make the business of stock feeding profitable—that is to sell nothing but meat, milk, or wool—on the older and best cultivated farms in this State But to grow good crops most farmers must have manure, and to get manure they must feed some kind of stock; and to make the farm profitable they must feed economically, save all the manure, and apply a considerable portion of it to the growing of such crops as sell for cash.

One of the things that require a good deal of careful thought and study in mixed farming, that is, growing stock and grain or other crops, is economy in labor, having everything arranged so that a little work will go a great ways. It requires more skill to do two things well than to do but one. It takes more brain work to combine stock-growing and raising grain, than it would to practice either alone, and it requires careful study when practicing both to keep one from interfering with the other.

Economy in labor should first be studied in laying out the farm, arrangement of the fields, second, in the rotation or plan of the crops to be grown, and third and not the least important in feeding stock, the arrangement of the barns.

Farmers often fence too much, have too many fields. The cost of fences is an important matter. At 90 cts. per rod it costs $567.00 to enclose a 160-acre farm. If the same farm is divided into 40-acre fields with a lane through the center, it will cost at the same rate $422,00 more; divided into 20-acre fields, $720.00; and into 10-acre lots, over $1,000.00 for inside fences, besides the loss of the land taken up by them. But the greatest loss from having small fields is time wasted in turning around with the plow, cultivator, mower or other implement. It takes the ordinary teamster considerable time to get out of one row and into the next. The larger implements cannot be used to good advantage where one-third of the time is spent in stopping and turning around at the corners.

The only object in having division fences on the farm is to provide fields for pasturage. These may be provided for to a large extent by the use of portable fences, or barbed wire fence that may be easily moved from one part of the farm to another. The barbed wire may be fastened to stakes one rod apart, driven into holes made with a crowbar; the wire is fastened to the stakes with small staples, and when the fence is to be moved the staples are drawn, stakes pulled up, wire rolled up on a wooden frame or reel and carried to wherever needed next. Two men can put up or take down from 50 to 80 rods in a day. Two wires will hold well fed cattle, and three quite unruly cows or steers; but a dozen wires will not keep in or out young pigs.

If horses are allowed to run in a field fenced with barbed wire, there should be light strips of boards, edgings or poles fastened to the upper strand with light common wire, otherwise they may not see the fence and run against the barbs and get scratched up.

It is best to have the farm divided into fields of regular shape, and as near the same size as possible. Many of our farms, when cleared or broken up, were cut up by fences into all sorts of shapes, and have remained so. Before these old fences are changed some general plan for the fields should be studied up and adopted, and every change made with reference to that plan. Whatever the arrangement of the fields there should be some direct way of getting to the barn for drawing in the crops and hauling out manure. Have plenty of gates. The sliding panel gate is made and hung so easily there is no excuse for driving 40 rods out of the direct line to get from one place to another on the farm.

In the arrangement of the crops it is generally best to adopt some regular rotation, after determining what the farm is adapted to growing, taking of course the market, capital to be used, labor required, etc., into consideration.

There are several good reasons for adopting a rotation. We will merely look at it from a labor saving point of view. It allows a systematic arrangement of the various operations to be carried on. The amount of labor and team work required, the number of head of stock to be kept, the implements needed, can be estimated for two or three years in advance if a rotation is adopted, as it is then known just how many acres of each crop will be grown in each year.

At the college they practice the following rotation: The farm is divided into fields of about 25 acres, each field being planted to one crop. The first year to corn; 2d year, roots; 3d year, oats or barley, sowed to wheat in the fall, and seeded with timothy; 4th year, clover sown on the wheat in the spring; 5th year, cut for hay; 6th year, cut one crop of hay and pastured, or pastured all the year; the next year corn is planted again, and so on. The manure is applied to the root crop, which usually consists of from 15 to 18 acres of rutabagas and beets, and the remainder of the field is planted to potatoes. Of these crops the wheat and potatoes are sold and the rest fed out on the farm.

We see there are 25 acres each of wheat, of corn, of oats or barley, of hay, and of roots each year. Some estimate can be made in advance how much stock will be required to consume the fodder, and the breeding or other means of procuring it provided for. There will be so many acres to plow each year, the same amount of stuff to handle, so that the number of men and horses necessary to do the work will be known beforehand. I do not recommend this rotation for farmers to adopt, because different farms will vary greatly in their requirements, the soil, size of the farm, and many other things will have to be considered.

A man who has no regular plan for his crops works at a disadvantage, one year he grows a large amount of one crop, the next year something else, he will have nearly the whole farm sowed to grain, and then in a year or two work into grass, and he will often lay out more than he can do, crops will be sowed late and will crowd him in seedtime and harvest, work will be poorly done, which will result in light crops; he can't keep any regular number of cattle or sheep, because the amount of feed will vary from one year to another. The more we study the matter the more reasons we can see for adopting some rotation of crops.

In preparing the plan for the rotation the following points should be considered: First, the farm should be divided into as many parts as there are crops to be grown; these fields or parts should be nearly of an equal size, so that there will be the same amount of work for each year. The crops should be so arranged as to distribute the work through the season, and the men and teams be kept steadily at work to good advantage, not driven at one time and little to do at another. Plan to have some of the plowing done in the spring and some in the fall; provide for one or two years of clover to keep up the fertility, and for at least one cultivated or hoed crop, when the land may be thoroughly tilled through the season to keep down the weeds.

THE BARN.

Farm barns as a rule are not built to economize labor in stock feeding. The object of the barn is to store the feed and shelter the stock; but something more should be considered when building, it should be planned to make as little labor as possible. Farmers usually commence with a small capital, they put up a small barn, in a few years their crops and means increase and they add to the barn or build another; by the time the farm is all improved they have several buildings, sometimes all joined together, and again scattered around in two or three places. If the stock are divided up, some here and some there, it requires double the labor to care for them. The barn should be so arranged that the hay, straw, etc., may be easily put into it. Second, so that the fodder may be taken to the stock with but little carrying. Third, so that manure may be taken out without more than once handling or wheeling a long distance; and fourth, on new farms, particularly, so planned that the capacity of the barn may be increased without destroying the convenience of arrangement. The plan of the barn will depend somewhat on the style of feeding,—whether the feed is to be cut up or fed whole.

The subject of cutting up and cooking feed can not be discussed in a few minutes. We will merely look at a few points. Cutting up fodder adds nothing to it, the only object in the practice is that stock may be induced to eat rough fodder, and eat it up cleaner than they would if it were fed whole, and it makes finer manure. It would not pay to cut up feed in a new country where fodder is cheap and labor high. It will only be profitable on valuable land, where hay is worth at least seven or eight dollars per ton, where rough fodder, as straw and stalks, are grown, and where enough stock is kept, say not less than 20 head, to require a large feed cutter run by some kind of power, either horses or steam. And even then it will not pay for the extra labor unless the barn is planned to reduce the work to a minimum.

Where land is worth $40 or $50 per acre under a good state of cultivation, with a regular rotation of crops and properly arranged barn, with from 25 to

50 head of cattle or horses, I believe it will pay to cut up the feed, and if pigs are kept it will pay to boil or steam all the meal or grain of any kind fed to both cattle and pigs when feeding to make milk or meat. They can be induced to eat and digest more of the cooked grain than when fed raw.

While not an advocate of very high farming, I believe farmers must look to the little things; they must study the closest economy in the details of the business. Capitalists are putting money into agriculture; they are introducing the careful, systematic methods acquired only through close business competition. Merchants and manufacturers, to succeed, must take advantage of everything possible. The same is soon to be true in farming. The careful, shrewd man with business habits will succeed, and the shiftless farmer will become a common laborer.

THE HORSE'S FOOT.

BY JOHN T. FRAZER, V. S., OF NEW YORK.

[Read at Rockford, Big Rapids and Manchester Institutes.]

Before entering upon the study of the horse's foot I would like to make an explanation. In corresponding with President Abbot in reference to a course of lectures before the Farmers' Institutes I tried to make it fully understood that my papers should treat of veterinary hygiene only, and I have restricted myself to these grounds for the following reasons: in the first place the profession of the veterinarian is legitimate and has its rights, which ought to be respected by the people of this country and defended by every qualified practitioner of veterinary medicine and surgery in the country; and these rights can be respected by the people and defended by the veterinarians only by each party carefully confining themselves to their respective fields. As lawyers, merchants and mechanics may be taught the proper means of keeping themselves in health, with great advantage to them and our country, so may the farmer be taught how to keep his animals in good health to their advantage, to his profit, and to the promotion of the public good; but when those animals are affected with disease and are treated by the farmer or by the neighboring horse doctor, or cow leech, then are the rights of the veterinarian violated; and whoever facilitates the acquisition of inadequate knowledge of the veterinary science and art by the farmer, or any other person, violates the rights of the veterinary profession; and the veterinarian who delivers popular lectures or essays in veterinary medicine or surgery prostitutes his profession and his talents; and for these reasons I shall in this paper confine myself as closely as possible to the hygiene of the horse's foot.

Zoölogically considered the horse's foot is the end of his finger, or toe; the true foot in this instance being that portion of the hind leg which we find between the point of the hock or gambrel joint and the point of the toe. The hock corresponds to the human ankle or tarsus, and the long round bone below the hock or knee in the horse (known as the cannon bone), and the two small bones attached to its sides (the splint bones) correspond to as many metatarsal or metacarpal bones in the human skeleton—according to the foot of the horse we may be considering—hind or fore.

At the lower end of the cannon bone, and placed behind it, we find two small bones, in form of irregular rhomboids, called the sesamoids; they are firmly attached by ligaments to the cannon bone, above, and to the bones of the digit below. In situ, these bones are covered with cartilage; their anterior faces serve to increase the articular surfaces of the fetalock joint, while the posterior faces form a groove through which passes the tendon of the flexor of the foot. The sesamoids, by means of their ligamentous attachments and form, at the same time act as braces to the fetlock joint, and as a pulley for the flexor tendon. Below the cannon we find the digit, composed of three bones, placed one upon the other, and a small, flat and transversely elongated bone, placed behind the third or last bone of the digit. The three bones forming the column of the digit are known as the first, second, and third phalanges, and the small flat bone is called the navicular bone. The first and second phalanges are flattened from before to behind and roughened for the attachment of ligaments and tendons. The third phalanx (*the os pedis*) or *pedal bone* is often called the coffin bone. It represents the segment of a very short cone, obliquely and irregularly truncated from its summit to its base. Upon the anterior face, and forming the summit of the bone, we find a roughened surface on which is inserted the tendon of the extensor of the foot; on the inferior, or plantar, face of the bone we find another roughened surface on which is inserted the tendon of the flexor of the foot. On the two faces of the bone we find a multitude of openings, of different sizes, which give passage to blood vessels and nerves entering the substance of the bone. Firmly attached to the sides of the bone we find two elastic bodies, when healthy, in form of elongated parallelograms, called the lateral cartilages. The pedal bone is covered by a dense fibrous tunic, which supports the delicate horn-secreting membrane; a portion of the lateral cartilages is covered by this membrane. The horse's hoof, and indeed that of all solipeds, is secreted or formed by this most delicate membrane which covers the fibrous and bony structures we have mentioned, as a sock does the human foot; it is continuous with the skin of the animal, but in examining it we will find that it is differently arranged in different parts of the foot.

We will commence the study of this membrane with the portion we find at the superior border of the hoof, or the coronet. The coronet is the matrix of the wall of the hoof, and is lodged in a depression which we find in the superior border of this horny case; its inferior border is separated by a white zone, from the portion of the membrane that we find on the anterior face of the pedal bone; the superior border is limited by a slightly projecting margin. The posterior portions of the coronet are narrower than the middle, and, on arriving at the parts of the foot known as the heels, they are reflected downwards and then forwards, onto the fibrous frog, where they are lost in the velvety tissue of that part. The surface of the coronet is covered with a multitude of thread-like bodies called papillæ; they are largest on the inferior border, and smallest upon the superior border where a layer of very compact horn is secreted. In the natural state the papillæ are lodged in the minute pores we find on the superior border of the wall. The structure of the coronet resembles that of the lower and middle layers of the skin of which it is, in reality, the continuation; it has a fibrous framework remarkable for its thickness and compactness. It is richly supplied with blood vessels and nerves, which may be traced to the extremities of the papillæ. The spaces between the blood vessels and the fibrous framework are filled with fat. Covering the inferior surface of the fibrous frogs and the plantar face of the pedal bone we find a modification of the coronet; namely, the velvety tissue. The surface of the velvety tissue is much the same as that of the coronet, being covered with papillæ of much the same size; the largest papillæ are found towards the external borders of the plantar surface, and the shortest are found in the cleft of the fibrous frog; they are all lodged in the minute pores we find upon the superior face of the sole of the hoof. The horny sole is secreted by the velvety tissue.

Upon the anterior face of the pedal bone, covering a portion of the lateral cartilages, extending backwards and covering the wings of the pedal bone, and finally reflected onto a portion of the plantar face, is the laminal tissue, or the sensitive laminæ; this portion of the horn-secreting membrane owes its name to the leaves, or folds, which we find upon its surface. The leaves, or laminæ, are from five hundred to six hundred in number, run parallel with each other and are separated by deep channels, into which are dovetailed analogous leaves on the inner surface of the wall of the hoof. The sensitive laminæ extend from the inferior border of the coronet,—where they do not project to so great a degree,—to the plantar border of the foot, where they each terminate in five or six large papillar prolongations which are lodged in the horny pores at the circumference of the sole; they increase in width from above to below; their free margin is finely denticulated or toothed, while the sides are traversed by folds, about sixty in number, which pass without interruption from top to bottom. The sensitive laminæ are not directly in contact with the long laminæ of the wall of the hoof, there being a layer of soft rounded cells between the two. The sensitive laminæ have much the same structure as the velvety tissue; they are immense flattened papillæ, and are among the principal instruments of touch in the horse's foot; they in reality play a mechanical part in concurring by their dovetailing with the horny laminæ, to assure the solidity of the union of the hoof pith the living parts.

The horn of the hoof has, except in the horny laminæ, a fibrous structure throughout; it is perforated by cylindrical canals whose upper end is funnel shaped, and contains the papillæ of the matrix, as we have already found to be the case: whether they belong to the coronet, or to the velvety tissue of the sole, the lower end reaches the inferior border of the wall or lower face of the sole or frog, they are rarely met with in the horny laminæ. The spaces between the canals are filled by concentric layers of flattened cells. The hoof being a dependency of the epidermis or outer layer of the skin is developed like it, by the incessant formation of cells in the layer that corresponds to the rete mucosum of the skin, at the expense of plasma thrown out by the numerous vessels in the horn-secreting membrane. In this way the papillæ are constantly forming layers of cells, which, one after the other, are crowded in a downward direction; and it is this secretion by the papillæ that gives the horn its fibrous appearance. The function of the papillæ is completed by the exhalation of a particular fluid, which maintains the flexibility of the hoof, and probably by the development of a quantity of cells found within the canals.

The sensitive laminæ do not, in the normal condition, concur to any extent in the development of the wall; the cells covering them are multiplied in describing a downward and forward movement, and though they are applied to the inner face of the wall, they do not constitute the horny laminæ: the latter are formed at the coronet, at the commencement of the sensitive laminæ, and they descend along the surface of the cells separating them from the sensitive laminæ. A proof of the theory that the coronet alone secretes the wall of the hoof, may be found in the manner in which the growing horn conducts itself in case of wounds of the foot. During the winter we often meet with wounds in the coronet, caused by the sharp calkins used in this country in shoeing horses, and in such cases it is usually necessary to cut away the horn of the wall, from the wound downward, in this way allowing the inflamed tissues to swell and providing a free outlet for the products of inflammation. When the inflammation has subsided somewhat and the healing process has commenced we find that there is formed a thin film of soft horn covering parts of the wound. This film increases in thickness, and being exposed to the air, becomes hard; but it has none of the characters of the horn we have removed. It is rough, having the different forms the wound may have had in its inflamed condition, and if we examine it with the microscope we will find the longitudinal canals wanting; but as the healing process goes on we find at the coronets a new growth of horn taking a downward direction, crowding the roughened horn we have described before it towards the lower border of the hoof, to be cut away in shoeing; and after a few months we will find that the hoof has much the same appearance that it had before the accident, and the horn the same structure, when examined with the microscope. The fact that the horn is secreted by the coronet is a most important one to the surgeon, as in all cases of accidents or operations upon the foot the coronet must be carefully preserved. The hoof of the horse, considered as a whole, represents a sort of box that envelopes the inferior extremity of the digit to which it is united in the most intimate manner, as we have seen. Its general shape is that of a half of a cylinder, cut obliquely across its middle, and resting on the surface of the section; but in nearly all feet it is slightly conical. Prolonged maceration separates the hoof into three parts, namely, the wall, the sole, and the frog. The wall is that part of the foot which we see when it is placed on the ground. The center of the anterior face of the wall is called the toe, and the parts on each side of the central portion are known as the outside and inside toes. The portions of wall found between the middle of the side of the wall and the points of reflection of the wall onto the plantar surface of the foot are called the outside and inside quarters; and the points at which the wall is reflected are called the outside and inside heels. The sole of the hoof is that portion of the inferior face situated between the inside of the wall and the frog and the reflected portions of the wall, while these portions of the wall receive the name of bars of the foot. The frog is the pyramidal body that we find between the bars and which projects into a notch in the center of the sole. Before leaving this subject I may be permitted to remark that the smooth and often polished appearance presented by the wall of the horse's foot is not due to a varnish of any kind, as is often claimed to be the case by horsemen, but is due to a thin and very compact layer of horn secreted at the superior border of the coronet. Having hastily glanced at the anatomy of the horse's foot we come next to study some of the diseases that affect it and the means of keeping it in health.

The disease commonly known as ring-bone is often located within the region of the foot, its seat in this case being the second phalanx and sometimes involving the coffin joint; it is then known as a "low ring-bone." The high ring-bone is found on the first phalanx or "*postern bone.*" A low ring-bone is always a serious affair, and it is rarely that treatment relieves the lameness. The high ring-bone is often found in horses without interfering with the action of the limb. Ring-bones are caused by blows, by the shock received while the animal is traveling over very hard ground, by strains from slipping, or in starting and hauling heavy loads, by which means the lateral ligaments of the joints may be overstretched and some of the fibers ruptured or torn from their insertions on either bone, causing inflammation of the ligaments or the bone and its fibrous covering, and a bony deposit in the part is the result. It is an established fact that this disease is hereditary, and all animals affected with it should be avoided for breeding purposes. It has been noticed by some observers that this disease affecting young animals is more frequent in case of those that have been poorly nourished than in those that have had plenty of good food; and I may be permitted to say that I think that poor keeping is a predisposing cause of the different diseases of this class, viz.: splints, bone spavin, and curbs; and even the different articular troubles, viz.: bog spavin, thorough-pin and wind-falls. I have often noticed that certain farmers are constantly troubled by some of these different diseases in their young horses, and that they make their appearance most frequently in the spring, soon after the horses are turned to pasture, and that these farmers have wintered their horses at a straw-stack, and from time to time thrown them a forkful of hay "when the weather is not so cold and they don't eat the straw so well," as the farmer says, but when, in reality, the horses least need the hay. I am sure that an explanation of the matter is not far to seek.

After such winter's care, the horses are turned to pasture in the spring, and in a few days, under the exhilarating influence of the fresh grass, commence their races and pranks; and the farmer soon finds his ornaments, if I may so speak, and here is our explanation: The system of the young animal, during the winter, has become weakened, much of the material that was in his ligaments and bones the preceding autumn, and of which there ought to be an increased quantity in the spring, has been consumed in the winter's "struggle for life;" and when the colt feels like play, the ligaments and bones are no longer strong enough to resist the extra strain brought upon them. There are again farmers who rarely find these diseases in their horses, and if by chance a case occurs, it is most frequently easily traced to an accident as a cause; their colts are always kept in a vigorous condition, and well sheltered in winter. I have often seen in the hands of those interesting individuals who delight in "trading horses," animals affected by some of these diseases of the limbs, which, in other respects, were the last horses we should expect to find troubled with any disease; and I am sure that if we could trace them to the farms on which they passed their first or second winter, the cases, with their mysteries, would be easily explained.

The lateral cartilages, with which we have become acquainted, are frequently the seat of disease. From their nature or composition these bodies are predisposed to alteration, if injured. Cartilage being the matrix of bone, readily becomes infiltrated with mineral matters, when irritated, and we often find the lateral cartilages of the horse's foot in this condition; they are then known as side bones. They are most commonly found in heavy draft horses, and in the fore feet, and are sometimes present without causing lameness. They are caused by blows upon the side of the foot, and by shocks received while the horse is traveling over hard ground. Horses troubled with side-bones should not be driven on hard roads, and the hoof should be prevented pressing upon the affected cartilage, by keeping it soft and elastic, and the shoe made to bear upon the sole of the foot. Horses having thin brittle walls are often troubled with sand cracks. These cracks, or fissures, may be in the toe of the hoof, or in the quarter. They are most frequent in the fore feet, and in the inside quarter. Horses having bad sand cracks, or having thin, brittle walls, should have their hoofs kept moist, during the summer, by soaking the feet in water, and in many cases it is well to place the feet in poultices of bran or linseed meal, and the wall should be anointed with glycerine from time to time.

If there may be any one present who thirsts for recipes, prescriptions, or specific remedies, I would commend to him as a foot ointment, pure glycerine, it being simple, cheap, and cleanly, and quite as, if not more, beneficial to the horse's foot than all the nostrums he can buy in the country at a double or trebled cost for half the quantity; and while we have the matter in hand, I will say that a bran or linseed-meal poultice will be found much more effectual for softening the horse's hoof than those relics of barbarism, which a due respect for my audience forbids me to enumerate. A contracted condition of the horse's hoof is not rare; it may be present as a primary affection, or as the effect of other diseases, or of bad shoing. Contraction always accompanies the disease of the navicular joint. In case of contracted feet we should endeavor to keep the wall moist and elastic, and it is often well to apply an irritant to the coronet, which will stimulate the secretion of horn; a small quantity of tincture of cantharides should be well rubbed into the skin just above the hoof. If the nature of the ground on which the horse walks will permit he should be allowed to go unshod for a time.

During the dry season we usually have in the late summer, or when a horse is taken from pasture and placed on a dry floor, we sometimes find that he becomes lame without showing any particular point or seat of the pain, but if we give him foot-baths or poultices, we find that the lameness is soon gone. The lameness in this case is due to an over-dry condition of the wall, and the horse may be said to be hoof-bound. In taking a horse from a long season at pasture, it is an excellent plan to use the foot-bath or poultice frequently at first, and to leave off by degrees. Glycerine also may be applied with advantage. Navicular disease is rarely met with in rural districts, save in horses that have worked a long time on city pavements, and, as it is considered incurable, we need do nothing more than to make the animal comfortable as possible; working on soft ground and at a slow pace. Laminitis or *founder* is congested or inflamed condition of the sensitive laminæ. It is caused by over-feeding, over-driving, or working, over-drinking, or drinking when the body is unduly heated, want of exercise, and bad shoeing, with some other causes that are not found on the farm in ordinary circumstances. It has been claimed "that a foot having a healthy hoof cannot be foundered;" but the men who hold and teach such an opinion can have but a most imperfect idea of the nature of laminitis, and of the structures it affects; just as the fairest human skin may become the seat of irritation, and be covered with blotches through a deranged digestive system, so may the horse's foot be congested, or inflamed, through an irritated condition of his digestive system, though it may be incased by the healthiest and strongest of hoofs. Every precaution should be taken during the winter to prevent attacks of this diease; when horses are idle they should be turned into a roomy yard, where they can take plenty of exercise, and grain should be fed in moderate quantities. If a horse has become foundered, and the disease has assumed the chronic form, he should be favored as much as possible; being kept on the farm and given slow work. The hoofs should be kept moist, and if thin, the coronet may be irritated with the tincture of cantharides, as I have described.

It is an excellent plan to allow horses affected with founder, to stand with the forefeet in a box of wet clay while in the stable; if the frost of winter renders the clay inconvenient, the foot-bath may be used instead; the feet being kept in the cold water for half an hour each day. Such horses should be allowed the freedom of the barn-yard, if possible, during the winter.

Horse-shoeing as an art has been known and practiced since time immemorial, and it is very probable that horse-shoes were invented soon after the subjection of the horse to man's rule. The primary object of shoeing is to prevent an undue wear of the hoofs while the horse is working, and in case of general purpose shoes for the summer, this ought to be the only object. But the horse-shoers of this country, following the example set them by their fellow men in other arts, have sought to improve upon nature, and as a result we have a system of shoeing against which untold numbers of horses throughout our broad land, are silently but piteously protesting. But in this age so prolific of reformers, and agitations, let us hope that the sufferings of the equine race will soon receive their share of attention, and that a speedy relief may follow. It is in the shoeing smith that we must look for any reform in the direction of horse-shoeing; and in the first place he must have ingenuity and intelligence, and secondly, be made acquainted with the scientific principles which are the true foundation of his art. The shoeing smith of to-day knows nothing of the structure of the organ with which he has to deal, and rarely has any sympathy with the temperament or intelligence of the horse. The majority of the shoeing smiths with whom I have become acquainted, do their work much as the galley slave treads his wheel, without heed, and with the same pace; each horse receives the same model of shoe, the hoof is prepared in the same way for each horse, and when the shoe is set the border of the wall of each foot receives the same amount of rasping. Such I have found to be the case in the extensive rural district in Western New York, with which I am acquainted, and I am sorry to say that Michigan is not more fortunate in the same respect. In the district I have mentioned there are at least one hundred shoeing forges, and if we could take one hundred horses—none of them lame, but each requiring a particular shoe, and different from the common form—and send one to each forge, with no directions as to the preparation of the foot, nor as to the form of shoe to be used, I am sure that when the hundred horses were returned to us we should find the whole number shod with shoes that might have been rolled over the same dies, and they would be of the pattern known as the "seated shoe," and more than that, we should find our hundred horses lame of the fore feet within a week. This is a generalization of an accidental experiment of the past spring. Having need of a sharply shod horse to use upon the icy roads of the season, I took one of my horses from the stable and left her at the smith's as I was passing. As she entered the forge soon after noon she showed no signs of being lame, and had never shown any during the six months I had owned her; but as I led her from the forge at five o'clock that afternoon I noticed that she did not seem to be comfortable on her fore shoes, and on the way home she showed unmistakable signs of being lame. The following morning she was worse and unfit for work. I at once removed the shoes and they, with the form of the surface they had rested upon, afforded ample proof of what had gone wrong. Seeing that I could not use her for work I turned her into the straw yard, where she soon commenced to improve, and in a few weeks was as well as before the shoeing. When I needed her again for work in the field I took her to another smith, giving him full directions as to the form of shoes to be used and the manner of setting, and my horse did her work through the summer without any trouble on account of her feet. Now I know that if I had not given directions to the second smith he would have put on the same form of shoes that had done the mischief before, and I should have the same experience in the forges of this town to-day, as I have found by examining the shoes therein used; and I fully believe that this blind mechanical routine of horse-shoeing has ruined more horses in our country than any other single cause; and it will continue its abominable work just as long as horsemen will allow their animals to be shod in such a manner. But what are we to do? may be asked with reason; the smith knows nothing, relatively speaking, and the horse's master knows no more. Verily there ought to be room between the two for a great improvement. It is in requiring a more intelligent class of men for shoeing smiths, and making them acquainted with the anatomy of the horse's foot that we must look for a remedy for this great evil. Certainly it can do no harm if the farmer or horse owner understands the make up of the horse's foot, but the smith should be taught to recognize the different forms of feet and the shoe best adapted to each particular form. The shoe which I have found in general use in the different sections of this country that I have visited is of the form known as the seated shoe, and when finished and ready for setting it is the realization of one of the most irrational ideas that ever emanated from the human brain. It must be so familiar to all who have seen horses shod as to need but a glance from us here. On the lower face of the shoe we find three blunt prominences called calkins. Now, in putting a set of these shoes on a horse's feet we place him upon twelve points of iron, and a more prolific source of slips, wrenches and strains of the horse's legs could not easily be imagined. Let us suppose that in being driven over the dry, hard roads of summer the horse places one of these toes upon a rounded stone; we find the toe tilted upwards, from behind forwards, and if he is traveling at a rapid pace there is every chance of straining some of the tendonous structures at the back of the limb; if the toe has been placed on the side of the stone the foot is thrown to one side, or slips, and in either case endangers the lateral ligaments of the joints of the limb. If the horse places one of these bed calkins on a stone he is pitched forward, and I have often thought that he must then feel much as we do when, in coming down a flight of stairs in the dark, we find that there is a step more than we counted on. I dare say that most of us know what an agreeable sensation is the result. I have often wondered what could be the object of putting such appendages to a shoe for summer wear, and I have as often asked the smith, "Why do you turn down those calkins?" "Why, to keep him from slipping, sir." "Ah, I see; but if I were to be stilted up in the air on six points like those calkins, I am sure I should soon require the services of the nearest bone-setter." But just at that moment the smith finds that the other shoe is nearly burnt, and I am left to draw my own conclusions amidst the merry peals of the hammer. The upper face of this shoe we will find quite as interesting as the lower. This face, we find, is divided into two portions; first a flat surface following the external border of the shoe and bounded on the inside by a bevelled surface; near the center of the flat surface, extending backward from the toe, there is a row of nail holes for the attachment of the shoe to the foot. This flat surface forms the seat of the shoe, and it is from this that the shoe takes its name. The bevelled surface of the shoe has often puzzled me as well as the calkins, and I have asked the smith for a little light on the matter. "Why do you bevel the shoe in that way?"

I ask. "Don't you see he is a little flat before, and if we didn't do that he would go lame." "Indeed! I see now, but are all of your horses flat before?" But the other shoe is at the right heat again, and the light from the white iron and glittering sparks is all I get. After questioning for a long time the utility and reason of this form of shoe, and the rather painful experience I have already mentioned, I sat about finding something that would better meet my ideal of an instrument for preventing an undue wear of the horse's hoof during the summer. I had noticed that the rolled shoes used for the hind feet were much narrower than those used for the fore feet. Taking one of these narrow shoes in hand I said to the smith, "Patrick, I wish you would shoe my horse with a set of these shoes without calkins, and make the shoe flat, and rasp the hoof down flat to match the shoe." It was now Patrick's turn to be puzzled, at least in appearance. "Don't you want a piece on the toe?" said he. "No, no toe pieces; you can draw out the heels a little to make the shoe level." "Won't she slip?" "I don't know; we will see." Well, Patrick did as I had told him, and much to his surprise, or disappointment, she did not slip, and from one set of this kind I went to five, and to Patrick's astonishment none of the horses slipped during the summer, though they often had wet clay hills to climb and descend, and they drew heavy loads onto smooth barn floors with all the ease they could have done had they been shod with calked shoes.

The plain, flat shoe as I have described it, has many advantages over the seated shoe, as we may readily see by comparing them. The seated shoe, as commonly made and set, affords a bearing surface for the wall of the foot only, and in a great many cases only the outer edge of the wall rests upon the shoe. If we examine a freshly pared hoof, we will find on the inferior face a light-colored line extending round the foot, parallel with the edge; this is called the white line, and it is here that the wall is united with sole. Now, if we should carefully watch a smith in setting a seated shoe, we would find that the white line is directly above the line that separates the seat from the beveled portion of the shoe, and often inside of it; by this means the horse is left to rest upon the walls of his feet, as the long blunt caulkins raise him too far from the ground to allow the frog to bear upon it, and thereby assist in distributing his weight. In such cases it is plainly to be seen that if the horse does not ball out of the walls of his hoofs it is not the fault of the shoes, nor of the man who set it, and in cases of horses having thin walled hoofs, we very soon have evidence of the mischief that is being done.

The seated shoe belongs properly to the class of surgical shoes, and never should be used as a general purpose shoe. The plain shoe, when properly finished, exhibits a perfectly flat and even surface for the hoof to rest upon, and it receives nearly equal portions of the wall and sole. It is by no means an easy task to induce many smiths to make this flat and even surface. The flattening must be done without increasing the width of the shoe; and this can be affected best by commencing the process at the toe of the shoe and working backwards towards the heels. The shoe must be the same thickness from toe to heel, and, if the sole of the foot is properly prepared by this means, the natural angle of the foot and pastern is maintained, and the danger from stumbling while the horse is traveling over uneven ground is much reduced. The foot is brought much nearer the ground, and if the frog, the organ of touch, of the foot when shod is left unmutilated by the knife, the horse is able to feel his way in traveling, and is much less liable to accidents and injuries. I have many times heard people say that their horses had been njured by small gravel stones working between the sole of the foot and the shoe; and though it has been my fortune never to have met with a case of this kind, I can easily understand that such might be the condition in case of the seated shoe; but with the plain shoe properly set such an accident would be next to impossible. The plain shoe will clear itself of mud or snow much more readily than will the other form, and is not liable to be lost by being torn off by suction while the horse is traveling over heavy roads. The flat shoe may be repaired quite as easily as the seated, and made to wear quite as long. During the winter, when we are liable to have ice, we must have sharp calkins for horses that have worn shoes during the summer; and as a shoe for this season I have taken the narrow, plain shoe, as I have described it, and turned down calkins as short as the smith could make them on his anvil. By this means the horse is not thrown up so far from the ground and travels better and more securely than he could with longer calkins. I do not for a moment pretend that the shoe I have brought before you is a great discovery in horseshoeing, nor that it is the shoe of the age, but that it is a very simple one and at the hand of any farmer or horseman who chooses to use it, and one which will be found a great advantage to the majority of farm horses for six or eight months of the year. There may be horses for which this form of shoe is unadapted, but they are very rare exceptions, and I have yet to find one. The plain shoe requires to be set with a great deal of care on the part of the smith, as indeed ought every shoe. In the first place the shoe should be made for the foot, for never was a horse's foot made for a shoe. At the first shoeing of the colt the foot should be kept at its natural angle, and ever afterwards this angle should be maintained. In preparing the foot for the shoe there are but two instruments that should be allowed to touch the hoof; they are the butteris and the rasp. There is, however, another instrument of which most of shoeing smiths are very fond, namely: the drawing knife, which has a curved blade, and it is with this knife that the narrow bearing surface of the sole is produced. The curved blade is well adapted for cutting out the concave surface of the sole, which never should be touched by the smith. In using the butteris and rasp a plain flat surface is left, which in a healthy fore foot presents a regular outline; but in the hind feet we find a distinct curve outward, the outside quarter forming a process upon the foot, as it were, but in this country the smith entirely ignores this process, and from the time the colt receives his first set of shoes to that of his last in old age, it is carefully rasped off, in order to give the foot a better shape perhaps; but it is simply a mutilation of one of nature's beautiful works, and should be known by its proper name. I am sure that if a smith would compare the graceful outline left in soft ground by an unshod colt's hind feet with the hard, studied curves left beside them by the hind feet of older horses, which are his own handwork, he would feel within him a sense of shame and humiliation that would forbid him ever again to try to improve upon nature. A flat bearing surface having been made on the sole of the hoof by means of the butteris and rasp, the shoe should be carefully fitted to it, the superior face of the shoe to the surface and the external border of the shoe to the external and inferior margin of the hoof, whatever its form may be, if natural; and the fitting should be done with the shoe cooled, so that it will not singe the horn. When the shoe has been fitted in this way there will be no occasion for rasping the outside of the wall, and another cause of contracted feet will be avoided.

Gentlemen, there are many other forms of shoes, some of them having great advantages and others being purely for surgical purposes, but time will forbid a further description. If any of you should undertake to apply any of the suggestions I have made here to the common mode of shoeing in your part of the country you must be prepared for many petty trials, most of them as provoking as they are trivial; but you may find a consolation, as I have, in remembering that a temporary failure or a possible accident is not the fault of the system, but is due to an oversight or misstep on your part.

SUPERPHOSPHATES FOR THE FARM.

BY R. F. KEDZIE.

[Read at Rockford and Big Rapids Institutes.]

How to maintain and increase the fertility of our soils, is the most important question that demands an answer from the farmer to-day. The early settlers regarded the soil as practically inexhaustible, and for many years cropped their land heavily without returning anything to the soil. Those were indeed happy times! The soil was so rich that it was simply necessary to "tickle it with the hoe and it would laugh with the harvest." Farm-yard manure was then considered of no value whatever, an incumbrance and a nuisance. And to get rid of it, the early settlers on the Mohawk are said to have resorted to the ingenious expedient of dumping it on the ice in the winter season, that the spring floods might sweep it away. But alas! times have changed. Sad experience has demonstrated the folly of this wasteful method of farming, and the descendants of those Mohawk settlers have learned that they must give back to the soil a portion at least of what they remove in the crop; and to-day they are glad to piece out their scanty supply of farm-yard manure with guano at $50 a ton. The great want of the farmer to-day is a good cheap manure. Farming is different from what it was fifty years ago. Values have changed, land has increased in price, the cost of labor is greater, and our farms are not as productive as formerly. The farmer knows that if he could raise large crops there would be a great saving, for the cost of growing the crop would be about the same as before,—and he hears of concentrated manures which may be bought in the market, at high prices to be sure, but which will give handsome profits. In this way, as the country has grown older, the so-called commercial manures, or "superphosphates," have arisen from the necessities of the times to hold a place among the possible resources of the farmer.

The term "superphosphates," I use in its popular sense to include all those commercial manures whose value depends upon the potash, phosphoric acid and nitrogen they contain, whether sold under the name of superphosphate or "blood and bone fertilizer," or "poudrette," or "guano," etc. Before entering upon the discussion of this subject, let us see what elements crops take from the soil, and what substances are needed in manure. The great mass of every plant is carbon,—but there is enough of that in the air to supply plants, so we do not need to add any to the soil. The same may be said of hydrogen and oxygen, the materials composing water. The only organic element that the crop needs in manure is nitrogen. To be sure four-fifths of the air is nitrogen, but it is in the gaseous form, and cannot be taken up by the plant. To be useful, it must be in the form of nitric acid, nitrates, ammonia, or in some other form of combination. The amount of these materials in the air and soil is very small, and they are very beneficial when applied to crops. The largest part of every plant comes from the atmosphere. Eighty per cent of every load of hay, and eighty-four per cent of every bushel of wheat are made up of materials derived from the air. So much for the organic elements. Now turning to the ash elements, we find sand, lime, magnesia, sulphuric acid and chlorine and iron. These are all present in soil in sufficient amount for crops. What then of the ash elements do soils lack that we need to supply? They want phosphoric acid and potash. But little phosphoric acid is present in soils, at the most not more than two-fifths of one per cent. It is combined with lime and magnesia as phosphate of lime and magnesia, and is very insoluble, being taken up by the plant very slowly. Potash is locked up in soil, in the form of the silicate of potash, and is exceedingly insoluble.

So it appears that all the materials needed in a manure are potash, phosphoric acid and nitrogen in a form that will dissolve readily in water, and so can be used at once by the plant.

Now, all this may seem pretty dry and perhaps difficult to understand. But the farmer of to-day who would be up with the times must understand something of the composition of soils, of the food his crops require, and what manures it is best to apply. I apprehend that many thousands of dollars have been wasted in fertilizers through not knowing what elements are needed for crops. The farmer should be a reading, thinking man. There must be a thorough mixture of brains in farming to achieve the highest success.

The foundation for the application of all fertilizers lies in a very thorough understanding of the composition of plants, and that knowledge we have. Many hundreds of analyses of agricultural plants have been published, and we know approximately how many pounds of the different elements any crop will take from the soil. What elements are necessary to enable plants to grow and produce seed was determined by German and French chemists by the method of "water culture," as it is called, in which the seeds of plants were sprouted in moist cotton and then put in jars containing water in which were dissolved all the elements except the one which they wished to determine whether it was essential to the growth of the plant or not. In this way it was found that when potash was not present the plants grew only a few inches in height, were feeble and sickly and soon died. In the absence of nitrates or ammonia plants failed to mature, and when phosphates were absent no seed was formed. There are a few other elements, such as sulphuric acid and chlorine that are needed for plants to grow, but they are usually present in the soil in sufficient amount for all crops.

Supposing we wish to buy potash, nitrogen and phosphoric acid for fertilizing purposes, in what form can they be obtained in the market? Of potash there are the crude salts that come from Germany mostly, such as the muriate and sulphate of potash. The latter is the cheaper, its cheapest form selling for $25 a ton. The nitrate of potash may be used, but this is more expensive than the others.

Of nitrogenous manures there is guano, containing from 11 to 13 per cent of ammonia, at $60 a ton, or fish scrap, or "dried blood" from slaughter houses. If phosphoric acid is desired, it may be bought in the form of ground bone at from $30 to $50 a ton, or as superphosphate, which is more soluble, and therefore more beneficial as a manure. As superphosphate is the only concentrated fertilizer that will probably be used to any extent in this State, I especially invite your attention to this manure, first as to its manufacture. Superphosphate is made by taking some material rich in phosphate of lime, such as bones, or spent bone-black from the sugar refiners, or the fossil or rock phosphate, as it is called, from South Carolina, and acting on it with sulphuric acid (oil of vitriol). Now, in these substances all the phosphate is but very slightly soluble in water. In them three parts of lime are united with one of acid. But when the oil of vitriol is added it unites with two parts of the lime, forming two parts of sulphate of lime, which is plaster. This leaves the phosphoric acid united with one part of lime; then it is called superphosphate of lime, and is very soluble in cold water. The only reason why the acid was added was to change the phosphate into a soluble form. Then usually there is added sulphate of potash, and dried blood from the slaughter-house to furnish the necessary amount of nitrogen, and the whole is sent into the market and sold as "superphosphate."

Let us look a little closer into the form in which phosphoric acid exists in superphosphate. There is first the *soluble* portion of which we have already spoken. Then there is always some bone or bone black that the acid did not act upon, which is called *insoluble phosphate;* and last, some of the soluble phosphate is sure to seize on some lime that is near and go back into a form insoluble in water, which is called *reverted phosphate.*

The question naturally arises, how can we tell the value of a fertilizer? A person might say, for example, that he sowed so many pounds of superphosphate on a part of his wheat-field and obtained a certain number of bushels more than where the fertilizer was not applied, and therefore the superphosphate is worth so much. Such a conclusion would be correct so far as that crop for that year was concerned. But no fact of general application can be deduced from this experiment, because of the variation in the composition of soils and the character of seasons. Judged by this standard, no two persons would agree on what the selling price of a fertilizer should be. The only way to judge of the value—that is the market price—is to see at what price per pound phosphoric acid, potash and nitrogen are selling in the market. With this data we can tell very nearly what the selling price of a fertilizer should be, knowing its composition. During the past season, on the average, soluble phosphoric acid has been selling at 12½ cents a pound, nitrogen at 20 cents, and potash at five cents a pound. Now, knowing how many pounds there are in a hundred of the fertilizer of these materials, it is very easy to calculate how much a ton of 2,000 pounds is worth in the market. If we could go into the market and buy superphosphates with the same confidence that we are getting a good article as when we purchase cotton cloth or sugar, the fertilizer question would be very much simplified. But we cannot. Of all the immense number of superphosphates sold comparatively few are worth near the price asked. Many of them are heavily ballasted with sand or ground oyster or clam shells, plaster, etc. One cannot judge of the value of a fertilizer from its appearance. It may "smell to heaven," and seem very "rich," and yet be nearly valueless as a manure. A good example of a fraud in this line is Popplein's silicated superphosphate. This company flooded the country with samples of their fertilizer, and issued circulars containing extracts from the works of Liebig and other writers as to the necessity of soluble silica for crops—ideas long since exploded. Let us see what their fertilizer for cereals, for example, is worth. Its selling price is $45 a ton; its actual value $17.50 per ton. Profit to the manufacturers, $27.50 per ton. Again, the price of the Lodi double refined poudrette is $25 a ton; actual value, $8.59 a ton. The price of the ammoniated bone is $48 a ton; real value $13.26 a ton. Russell Coe's superphosphate, selling price $60 per ton; real value $33.50 to $34.50 per ton. Wilson's superphosphate, price $55; actual worth $23 to $25 a ton.

In many of the States the sale of fertilizers is so great, and there is such an excellent opportunity for fraud, that laws have been passed to protect the farmer against this swindle. The law of Connecticut read thus: "Every package of fifty pounds or more of commercial manure sold or kept for sale at over one cent a pound shall be marked with its weight and the name and place of business of the manufacturer or seller, and with a true analysis of the chemical elements and their several amounts contained therein. Any manufacturer or trader who shall sell or offer for sale any package containing fifty pounds or more of commercial manure not marked as required by law, or who shall affix thereto a stamp, impress or card claiming that it contains five per cent more of any fertilizing ingredient than it does in fact, shall forfeit ten dollars for each hundred pounds thereof so offered for sale." This is probably the most effective of all the laws enacted to prevent fraud in fertilizers. There is an agricultural experiment station at Middletown where fertilizers will be analyzed for a small price, and nearly all fertilizers are submitted to them before put in the market. The sale of fertilizers in this State has not reached that extent to make laws on the subject necessary. One way to get a good fertilizer is to deal with well known firms who have reputations to sustain. It may almost be taken for granted that those firms who have agents puffing their wares are selling a poor article, for the salaries of the agents must come from their customers.

At the present time there is only one superphosphate made in this State. The Michigan Carbon Works of Detroit are manufacturing a high grade superphosphate from bone black. Sulphate of potash is present, and dried blood is added to furnish the necessary amount of nitrogen. A ton of their fertilizer contains from 160 to 200 lbs. of soluble phosphoric acid, 25 lbs. of reverted phosphoric acid, and 40 lbs. of insoluble phosphoric acid. Also about 40 lbs. of potash, and the same amount of nitrogen in a form that will be readily converted into ammonia in the soil. I do not care to advertise their fertilizer further than to call the attention of those desiring superphosphates to the fact that we have a very good article made within the State. As superphosphates are liable to be adulterated and worthless, farmers are usually advised to make the fertilizer themselves. I find one receipt for preparing superphosphate, which is as follows: "Superphosphates may be manufactured at home by getting up a sufficient quantity of dry bones, making a large heap mixed with dry pine wood, and burning the whole mass to ashes. Pound and sift till the ash is reduced to a powdered mass. Now have ready a box, water tight, of suitable dimensions, into which put the bone ash and add sufficient water to wet the mass thoroughly. Then take the brown acid of commerce, and to every gallon add about four gallons of water. Pour on the moistened bone ash this diluted acid, slowly, keeping several hands stirring with wooden paddles. * * * Continue to pour on the acid until the contents of the box becomes a semi-fluid mass, and all effervescence ceases. * * * One carboy of acid might be used on 300 lbs. of bone ash." *

But I do not believe the farmer can afford to made this fertilizer. Its man-

---

* Pendleton's Scientific Agriculture, p. 293.

ufacture is entirely "foreign to the legitimate business of the farm." If we take into account the cost of ground bone (for the bone must be as fine as sawdust), the cost of the acid, cost of transportation, the time required, the danger of injury to the person or clothes by spilling the acid, I do not think it will pay. If the farmer has a quantity of bones on hand, a better way would be to mix them with unleached wood ashes, and keep the whole in a moist condition for a few months, when the bones will be so soft they may be crushed with a spade.

Superphosphate of lime is valuable as a manure for two reasons: In the first place, the phosphate will be at once assimilated by the plant. It gives an immediate return for the money invested. There is something singular about this fertilizer. Where it is applied to the soil it unites with the iron and lime of the soil, and goes into a condition insoluble in water. But it is so finely divided, the plant can absorb it readily. Persons have supposed that the soluble phospate nourished the plant in its younger stages, and the insoluble portion when the plant became more mature. But from the fact that it is all equally insoluble in the soil, this cannot be the case. In the second place, superphosphate is valuable because it sets free other elements in the soil for the use of plants. For example, it was found in England some years ago, that superphosphate was a very valuable manure for turnips. How to explain it was the question, for the turnip is not a phosphate loving plant. Finally it was discovered that phosphoric acid set free potash from its combinations, and potash is just what the turnip wants. The indirect effect of manures in setting plant food free in the soil, is often greater than its direct effect of feeding the crop. Superphosphates are valuable for grain crops, because they hasten the formation of the seed. Florists understand this fact well. If they wish their plants to make a vigorous growth, they water their plants with a dilute solution of ammonia (hartshorn). But if they wish their plants to blossom, superphosphates are applied.

What and how much of these concentrated fertilizers shall we apply to different crops, and in what way? This is a difficult question to answer, for soils vary greatly in composition as well as the manures. We should study the composition of different crops and see upon what substances the plant will thrive the best and give the largest return. Wheat, barley, oats, rye, natural grasses and beets are feeders on nitrogen especially, and this may be given them in the form of guano or sulphate of ammonia, or nitrate of soda, or nitrate of potash. Peas, beans, clover and potatoes are potash feeders especially, and will be benefited by potash salts, while maize, sorghum, and sugar cane would be benefited by superphosphate of lime or bone dust, while turnips are most benefited by superphosphate of lime. But the superphosphate found in the market usually contains all these elements and could probably be applied with good effect to any crop.

The Michigan Carbon Works of Detroit, whose superphosphate represents fairly the average of that class of manures, recommend the following amounts for the various crops: "For corn or potatoes, apply one or two tablespoonfuls to each hill, thoroughly mixing with the soil; then drop the seed—or corn can be drilled in—200 lbs. to the acre. For wheat, 150 to 200 lbs. per acre, drilled in with a fertilizer drill. If sown broadcast, 200 to 400 lbs. per acre. For oats and barley, 100 lbs. per acre. For grass, 100 lbs., either late fall or spring." But in the application of fertilizers no recipe can be strictly followed. Each one must decide for himself by actual experiment what amount it is best to use.

By the use of fertilizers is not the size of the crop we wish to gather within our control? For example, if we want twenty-five bushels of wheat to the acre, cannot we add to the soil the elements that so much wheat would require and the crop be forthcoming? If fifty bushels, the elements required, and so on within certain limits? This is the view held by one eminent agricultural writer in the east. His theory is, that what the soil would produce without manure would be enough to pay interest on the value of the land, taxes, and cost of cultivating the crop; that by the application of fertilizers containing the elements for a crop of any size, within certain limits, the crop of that size will be obtained. If this theory is correct, its application would eliminate all uncertainty in farming. But there are too many conditions in agriculture beyond our control to make this theory a success in practice. The soil may not be in a proper condition for the application of a fertilizer. It may need drainage, or be of so light quality that much of the value of a fertilizer would be washed out of the soil before it could be appropriated by the crop.

But if the farmer was certain of a crop of the size he desired, would it pay him to apply the necessary elements in the form of fertilizers? Suppose, for example, a crop of twenty-five bushels of wheat is desired, it would require manure as follows:

41 pounds of nitrogen @ 20c. per lb.	$8 20
24 " potash @ 5c. per lb.	1 20
20 " phosphoric acid @ 12½c. per lb.	2 50
Total	$11 90
Cost of straw	3 60
Total cost of crop	$15 50

The manure for 25 bushels of oats would cost $7.10; for 100 bushels of potatoes, $7.28; for one ton of red clover hay, $11.28. Perhaps the high price of fertilizers in the east will repay the use of fertilizers to this extent, I am sure it will not pay in Michigan.

This method of estimating how much manure to apply loses sight of the fact that the soil furnishes the most of the food for the crop. The soil is not inert matter, simply to support the plant and hold the food for the crop; it is the principal factor in producing the crop. In the words of Prof. Kedzie, "The soil is something more than the platter to hold the plant's dinner. The soil, so far from being the mere dish to hold the food is itself the *roast beef*, the principal dish of the meal, while the manures we use with profit are merely the pepper and mustard which makes the beef palatable and digestible."

There are undoubtedly cases where commercial fertilizers could be used to good advantage, *e. g.*, on a soil that is so utterly barren that no crop can be grown upon it with profit and farm manure cannot be obtained. Prof. Johnson gives an account of improvement of light soil in England by this means. He says: "About the middle of the last century a light-house known as the Dunstan Pillar was built in the Lincolnshire Heath, in Lincolnshire, England. It was erected to guide travelers over a trackless barren waste, a very desert, almost in the heart of England, and long it served its useful purpose. The pillar, no longer a light house, now stands in the midst of a fertile and rich farming region, where all the land is in high cultivation. For twenty-five years no barren heath has been visible, even from its top. Superphosphate of lime, a chemical invention, first applied to the land by the British chemist Murray, and brought to notice of reading farmers by Baron Liebig, has been the chief means through which this great change was effected. Superphosphate, over great stretches of English soil, makes, or once made, the turnip crop. Turnips there support sheep, and with sheep the English farmer knows how to get rich on the poorest high land."

May not the time come when the light, sandy soils of the northern part of our State will be reclaimed to agriculture by the same methods that have succeeded so well with the English farmer? Analysis has shown that our lightest sandy soils are not entirely deficient in the elements of fertility, and the time may come when these waste lands shall be made as productive as any in the State.

While superphosphates and fertilizers are valuable in their place, I do not think that the farmers of Michigan at the present time, can afford to depend upon them as manure for the farm, for the following reasons:

1st. As a rule, our soils are not sufficiently exhausted to require any such powerful stimulant. They have been cropped for only a comparatively short time; and when soils do not give good returns it is largely caused by incessant cropping with shiftless cultivation. Deeper culture, with the application of barn-yard manure, will generally accomplish all the results of a high priced fertilizer with one-half the cost.

2d. Because farmers in the eastern States can use superphosphates with profit, it does not follow that it can be in other States, because the conditions are different. In the East, the price of land is higher, and many farmers are situated near large cities where special crops may be grown for the market at extra prices. Then, in many cases their lands are greatly exhausted by severe cropping. Mr. S. L. Goodale of Maine, in a lecture on commercial fertilizers, says:

"*There are few New England farmers who do not have to deal with crippled land*, land unable to bear the burdens of successful agriculture without artificial helps,—unable too in part because we, and our fathers have dealt hardly by it. We have taken too much from it and given too little to it, and the day of reckoning has come, as come it always will, sooner or later, where the laws of order are violated."

3d. I doubt if farmers, as a rule, can afford to buy fertilizers and pay the price asked for the phosphoric acid, potash and nitrogen they contain. A good quality of superphosphate costs $40 a ton. Nearly all the materials used in making it are brought from a distance. By the time the fertilizer reaches the consumer it is a very expensive article.

4th. As commercial fertilizers are generally used, the land does not tend to become richer, but poorer. The farmer who uses costly manures, naturally wishes to get a return as soon as possible for the outlay. This cropping, year after year, impoverishes the soil, for the crops taken off remove all the manure added, and more. The object in farming should be, to not only have large crops, but to have the soil as rich at the end of a rotation as at the beginning. This is the only way in which farming can pay in the long run.

It seems to me that the way to success in farming to-day, lies in solving the question, How can we produce the most manure on the farm at the least cost? While farm manure is not so rich as commercial fertilizers, it is in itself a complete manure,—it contains all the elements needed for crops, and in the right proportion. In the words of Mr. Goodale: "If we deal honestly with our soil, first converting the crops into meat, and milk, and wool, and manure, and then save the manure and apply it, such practice will suffice to support us handsomely, and can be kept up with increasing fertility, as long as the world stands."

MISCELLANEOUS PAPERS.

THE TONGUE OF THE HONEY BEE.

BY PROF. A. J. COOK.

[Read before the National Bee Keepers' Association, at Chicago, October 21, 1879.]

The bee is, and has long been, of great importance to the commercial world, and this, together with the fascination inseparable from its study, have led many of the ablest scientists to carefully investigate its structure and habits. Yet I know not if there exists to-day an accurate description of a bee's tongue, and the method by which the insect procures its food.

The literature of the subject abounds in confusion and inaccuracy. The most learned scientists, those usually the most careful and accurate, like Reaumur, Newport, and Carpenter, give voice to palpable errors. Even the last edition of the Encyclopædia Britannica gives further life to these old erroneous views. Let us give brief attention to some of these descriptions.

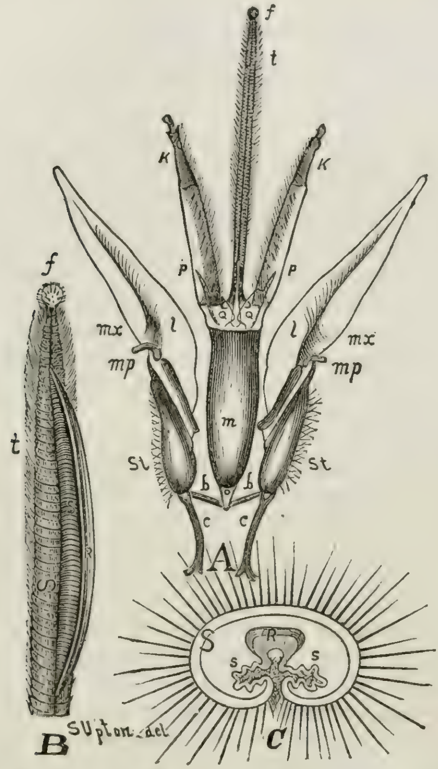
Hogg says the bee's tongue is cylindrical; Kirby, Spence, and Neighbour state that it is flat; Reaumur and Chambers that it is between the two. Reaumur, Newport, Kirby, Spence, Carpenter, Shuckard, Bevan, and Hunter all state that the tongue is solid, and that the honey is lapped up, or taken through a tube, formed by the close approximation of the maxillæ, labium, and labial palpi. Newport speaks of a hairy sheath along the under side of the basal two-thirds of the organ. Neighbour says there is a gutter throughout the entire length of the tongue, while Swammerdam, Lamarck, Burmeister, Wildman, and Munn claim that the organ is tubular. Newport and Carpenter assert that the bee's tongue is muscular, which is denied by Cuvier, Reaumur, and Chambers.

That bees lap the nectar is affirmed by Reaumur, Newport, Kirby, and Spence, Savigny, Carpenter, Bevan, and Hunter; while Swammerdam, Wildman, Lamarck, Burmeister, Munn, and Neighbour claim that the bees take liquids by suction.

Amid these conflicting views let us see if we may find the truth. To do this we must examine closely the structure of the organ, and also watch the insect as it is taking its fill of honey or some other liquid.

In the April number of the Journal of the Cincinnati Society of Natural History, for 1878, Mr. V. T. Chambers, an able entomologist of Covington, Kentucky, published a very admirable paper upon this subject. In the American Quarterly Microscopical Journal for 1879, p. 287, the subject was again presented in a beautifully illustrated article by Mr. J. D. Hyatt, President of the New York Microscopical Society. I learn that Wolff has published a fully illustrated memoir on the anatomy of the honey-bee which, I regret to say, I have not seen. From Messrs. Chambers and Hyatt's papers, and my own researches and observations, I am able to present the following facts:

The mouth-parts of the honey-bee brought into requisition when the insect takes a liquid into its pharynx, are the maxillæ and the labium.



Tongue of a Worker-Bee, much magnified.

A—Maxillæ and labium.

mx, mx—Maxillæ.
c, c—Cardos.
St, St—Stipes.
l, l—Laciniæ.
mp, mp—Max. palpi.
o—Sub mentum.
m—Mentum.
p, p—Paraglossæ.
k, k—Labia palpi.
t—Tongue.
f—Funnel.

B—Ligula, with sack distended.

s—Colorless membrane.
f—Funnel.
R—Tubular rod.

C—Cross-section of ligula.

S—Sheath.
R—Tubular rod.
s, s—Colorless membrane.

The maxillæ or second jaws (see *mx* in Fig. A) are situated each side of the labium. They are hinged to the head by the strong cardos (see *c c* in Fig. A) which are chitinous rods. Extending forward from the cardo is the more flattened stipes (see *st st* in Fig. A) which is also mainly chitinous. From the stipes projects the triangular, deeply grooved lacinia (see *l, l* in Fig. A). This is more membranous, but it is strengthened by a ridge of chitine which extends to the apex. At the base the very rudimentary maxillary palpi (see *mp, mp* in Fig. A) are visible, while scattering hairs project from the inner margins. When the maxillæ are brought close together a tube is formed, which is continued by aid of a colorless membrane to the opening into the pharynx. This opening is beneath the labrum and between the mandibles. The colorless membrane is continuous with the epipharynx. The muscles which move the maxillæ are attached mainly to the cardo and stipes.

The labium or lower lip of the worker honey-bee is from twenty-three to twenty-seven hundredths of an inch long. It consists of a central portion, and two pairs of appendages, the paraglossæ (see *p*, *p* in Fig. A) and the labial palpi (see *k*, *k* in Fig. A). The central portion is divided into a basal two-sevenths, or mentum (see *m* in Fig. A) and the terminal five-sevenths or ligula (see *t* in Fig. A and B). The mentum is about seven-hundredths of an inch long. It is hinged to the sub-mentum (see *o* in Fig. A) which in turn is hinged to the maxillæ by two chitinous rods (see *b*, *b* in Fig. A). These rods permit free motion, and to them are attached muscles, which in part affect the movement of the labium. The mentum is a flattened cylinder, the floor and sides of which are thick and opaque, because of the abundance of chitine contained in their structure. While lining this chitinous gutter and completing the tube is a thin colorless membrane, which is but the anterior prolongation of the pharynx. There also abundant muscles within the mentum which extend even for a short distance along the sides of the base of the tongue. These not only affect the motion of the whole labium, but also protrude and retract the ligula or tongue.

The ligula or tongue (Fig. A and B, *t*) extends from the anterior extremity of the mentum. It consists of a sheath (Fig. B, *s*) which from the many rows of yellowish hairs appears annulated. When not distended, the sheath, as seen in cross-section Fig. C), is kidney-shaped. It has a slit (Fig. C, *h*) along the under surface, from the base very near the end. In some specimens the slit seems to reach quite the end. Within the sheath is a small colored, triangular rod (Fig. C, R) darker than the sheath, which except for a slit (Fig. C, *h*) on its under surface, would form a tube (Fig. C, R); in fact the sides of the rod along the slit can be brought in such close contact as virtually to form a tube. Fine hairs project from the walls either side the slit (Fig. C, *h*) into the tube, which doubtless aid in making the tube more perfect. Along the back of the rod is a conspicuous layer which Mr. Hyatt asserts is muscular. If this be so we can readily see how its action would spread the walls and open the slit. The rod projects beyond the sheath, as an imperfect funnel, the "button" of Reaumur (Fig. A and B, *f*). The wanting section of the funnel harmonizes with the slit in the rod. Near the end, the rod seems firmly attached to the sheath. Any attempt to draw the rod from this position is quite certain to rupture the sheath. The rod when extended projects from sixteen to eighteen-hundredths of an inch beyond the mentum. At the base the rod is colorless, and its tube connects above with the membranous sac next to be described, and through this with the tube of the mentum and with the pharynx.

Attached to the edges of the sheath, next to the slit, and possibly, as Mr. Chambers thinks, entirely lining the latter, and also to the corresponding edges of the tubular rod is a thin membrane (Fig. C, *s*). Mr. Chambers thinks this passes over the slit in the rod, making the tube of the latter complete. I have reasons to think he is mistaken as will appear in the sequel. When not distended this membrane lies in folds (Fig. C, *s*); but when distended it with the rod pushes out of the sheath, so as to form with the latter a large tubular sack (Fig. B S, *s*), with the tubular rod (Fig. C, R) along the surface opposite the sheath. At the base this sack has a chitinous support (Fig. A, Q Q), and connects through the tube of the mentum with the pharynx, and receives the tube of the rod. It extends nearly if not quite to the end of the sheath, certainly as far as the slit in the latter extends, and is, anteriorly, imperforate.

The labial palpi (Fig. 1, A, *k*, *k*) like the maxillæ, are deeply grooved, and when brought close together form a tube which also has a membranous connection with the mouth opening into the pharynx.

The paraglossæ are short, leaf-like organs (Fig. 1, A, *p*, *p*) with a hollow membranous base, which also connects with the tube of the mentum and the sac of the ligula.

When not in use the ligula, with the labial palpi and maxillæ, all double back under the head, and the tongue is so retracted that it extends no further than the labial palpi. This shortening of the ligula seems to be effected by drawing the more membranous and less hairy base into the mentum.

How do bees take liquids into their stomachs? This question, as we have seen, has received various answers. Some have thought that the nectar was drawn through a tube formed by the approximation of the ligula, the palpi, and the maxillæ. Others that suction was the force and the tongue the tube. Still others have believed that the nectar was lapped up by the bees. I hope to be able to show you that all are right.

Look at a bee through a good lens (I have used Toll's one-half inch) while sipping honey containing grains of solid matter, and the fine particles will often be seen to ascend through the tube formed by bringing the maxillæ together. We have already seen how this liquid passes to the mouth and through this into the pharynx. Or we can color some rather thin honey or syrup by aniline (I have found deep red to be the best), and while the bee is sipping this colored liquid, which it does as eagerly as though the poisonous aniline were not present, cut off its head, which, with a pair of dissecting scissors is done in an instant. Examination plainly shows the track along the channeled maxillæ and palpi, even to the mouth, which clearly reveals the path of the liquid. These conduits are much the larger approach to the pharynx; thus we see why bees take honey so fast when they can get freely at a large quantity, and why a few days of good basswood harvest are so fruitful.

Bees as surely take honey through the triangular rod which is enclosed within the sheath. I have proved this in several ways as follows:

I have placed honey in fine glass tubes and behind fine wire gauze, so that the bees could just reach it with the funnel at the end of the rod. So long as they could reach it with the funnel so long would it disappear. I have held the bee in my hand, by grasping the wings, while observing it with a good lens. I would gradually withdraw it from the drop of honey, which it would sip so long as the drop was within reach of the funnel. I have in such cases seen the red axis when the bee was sipping colored syrup. Subsequent examination by dissection revealed the red liquid still in the tube of the rod, clearly showing its course in passing to the pharynx. If we place the tongue with a drop of water on a glass slide and cover with a thin glass, and then look at it through the compound microscope, with a magnifying power of eighty diameters, we can readily see the liquid pass back and forth in the tube as we press with a pencil on the thin glass cover. As Mr. Chambers states, this tube at the base of the funnel is only one five-hundredth of an inch in diameter. We now understand why bees are so long in loading their stomachs when gathering from small tubular flowers, as then this minute tube is the only avenue by which the bee secures the nectar. We can also well understand why they gather so much faster from some flowers than from others. In the one case they secure the liquid sweet through both the channels above described; in the other, when the honey is scarce or deep down in small tubular flowers, they can only use this microscopic tube.

We also note the admirable construction of the tongue, which permits it to probe these tiny flowers, and also see the advantage of even a little additional length in this important and wonderful organ.

I also believe that bees lap up the honey. If we spread a thin layer of honey on a glass, and permit the bees to visit it, we shall see the bees wipe it up with their ligulæ. Fine drops disappear even though the funnel does not touch them. From this observation, as well as the structure of the organ—if I am right in believing that the slit in the rod opens on the surface—we can but conclude that the slit in the rod, no less than the funnel, may be the door whereby liquids pass to the tube. If Mr. Hyatt is right in thinking that the dorsal band of the rod is muscular, we can readily see from its position and the form of the rod, how the slit might be opened. If the liquid is very thick the bees are seen frequently to retract the ligula and then extend it, as if to clear the organ by scraping it between the maxillæ and palpi.

While sipping honey the bee performs a kind of respiratory movement with the abdomen. This shows that the force of suction comes partly, if not wholly from the stomach, which organ is situated in the abdominal cavity. The tongue is also retracted and extended rythmically while the bee is sipping. The tip passes alternately back and forth from its greatest distance from the mentum to the end of the palpi. This movement may be something analogous to swallowing.

I am not certain as to the function of the membranous sac. I have found that if I killed a bee by compressing its thorax, very soon after it commenced to sip the colored liquid, that the latter was always in the stomach but not in the sac. If I waited longer I found the sac also partially filled. This leads me to conclude that it acts as a storehouse, enabling the bee to carry a load beyond the capacity of its stomach. It also appears glandular, when distended, so possibly it secretes an animal juice or ferment which aids in changing cane sugar into glucose or grape sugar; for we find upon analysis that pure cane sugar after passing through the stomach of the bee has partially undergone this transformation.

After the bees have sipped the colored liquid, I find invariably that the tip of the tongue—the small portion where the slit in the sheath seems obscure, and where the rod seems more firmly attached to the sheath, is highly colored, as though full of liquid. Possibly the sac does not extend into this portion, and the tube may be larger in this part. By a little pressure the liquid is made to pass out of this portion of the tube, either through the funnel or slit, perhaps both.

I have measured hundreds of tongues, under the microscope, with the camera lucida, and have been much interested to observe the wondrous uniformity in length where the bees were from the same colony or from the same apiary, especially if close breeding had been practiced. Tongue after tongue would show a variation of less than .025 of an inch. I have found the length of the American black bee's tongue to average about .24 of an inch in length, from the base of the mentum to the tip of the ligula. American-bred Italian bees I have found, when measured by the same scale, to have tongues .02 of an inch longer. Some bees, said to be Cyprians, but closely resembling our black bees, except that the down on the thorax was a little more yellow, I have found to possess tongues a little shorter than those of our American Italians, though the average is but very little less. I have examined bees' tongues from workers reared from two different imported Italian queens, and found that in both cases they exceeded in length those of our American-bred bees, though the difference is very slight.

In 1878 I measured the tongues of some bees sent me for Cyprians. The bees were very yellow and beautiful. I found them to possess the longest tongues I have ever met, but there was very great variation. I had but few bees and sent for more, which never came. I had arranged the present season for bees of the various European races, and had been promised specimens, but greatly to my regret and disappointment, the bees have failed to come, so I have to make this but a partial report.

That the added length is of practical importance I have proved as follows: Honey in a vessel covered with fine gauze was placed before Italians till they ceased to eat because the honey was beyond reach. The vessel was then placed before black bees, which failed to reach the fluid. The vessel was then filled and given first to the black bees, which worked till the liquid was inaccessible, when it was placed before Italians. These would invariably commence to sip the honey. Again, a box one-half inch deep, without top or bottom, was covered with fine gauze having fifteen meshes to the inch. A glass was then placed in the box so inclined that while one end rested against the gauze the other was one-half inch from it. The glass was thinly spread with honey on the side next the gauze. This was placed in a hive of Italians, when the glass was cleaned of honey for a distance of twenty-four meshes from the edge where the glass rested on the gauze. The black bees could only reach and only cleaned for nineteen meshes. Many trials gave the same result. This then shows why Italians can gather, and often do collect from flowers which fail utterly to attract the black bees. The nectar is beyond their reach.

It would seem from the above that American-bred bees have shorter tongues than those direct from Italy. It seems very probable that "natural selection," the very law which raised Italians to their position of superiority, also gave to them their longer tongues. Shut up in their mountain home, a mere isolated basin, where competition must have been very excessive, nature took advantage of every favorable variation and developed those striking excellences peculiar to the Italian. During these ages there was no kindly bee-master possessed of the intelligence sufficient to nurse the weaklings, nor any "Dollar Queen business" to stimulate indiscriminate breeding, and the weak died victims to starvation. And so we are indebted to the stern, inexorable law of nature for the incomparable breeding which wrought out such admirable results in far-famed Liguria. Unquestionably the crowded apiaries of Austria and Germany have heightened the "struggle for life," and had a similar tendency to develop superior excellence in the European black bees. It is more than probable that the German bees of crowded Europe have longer tongues and are generally superior to the same in America, where they have long been favored with broad floral areas and comparative absence of competition. I should expect that this very law might have developed varieties of the black race which are superior to others of the same race. It is more than possible that "survival of the fittest" explains the origin of the superior varieties which are said to exist in various provinces of Europe. For the same reason we should surely expect superior excellence in the Cyprian bees. Crowded as they have been for long years or ages in their small island home, the principle of "survival of the fittest" must have been working powerfully to weed out the inferior and to preserve and make stronger the superior. And so the great poet has well said: "Sweet are the uses of adversity."

From the above considerations it seems obvious, that would we perpetuate the excellencies given us by the skillful breeding of nature, though we may not destroy all the feeble, as nature has done, we must assuredly study and observe so closely, that we shall know of a surety which are our very superior queens, and be even more careful to breed from no other. Whether care or carelessness will be most promoted by our present system I leave for you to say. But I do wish that we might have at least a few breeders with time, means, caution, skill, and patience, who would work with earnest zeal to not only keep all the excellence we now have, but to augment this excellence, as I am sure it may be augmented.

But if our cheap queen system is to continue, then, surely, we may well stimulate frequent importations from Italy and Cyprus, and thus hope to compensate in part for what will be lost by hasty, careless, and indiscriminate breeding.—*American Bee Journal.*

THE STING OF THE WORKER BEE.

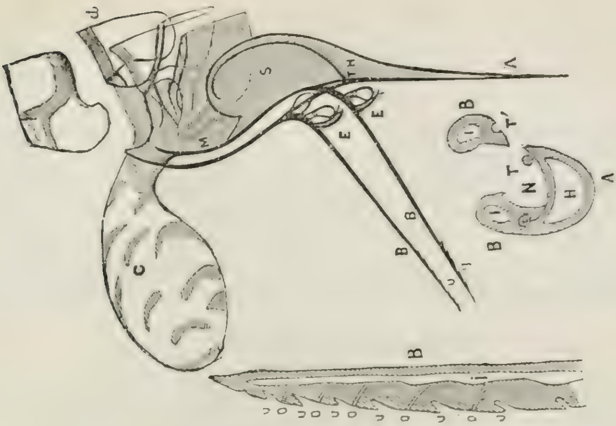
PROF. A. J. COOK.

[From Manual of the Apiary, 5th Edition.]

The worker bees possess an organ of defense, which they are quick to use if occasion demands. This organ is straight, not curved as is the sting of the queen. The poison, which is emitted in stinging and which causes the severe pain, is an acid fluid, which is secreted by a double gland, and stored in a muscular sack (Fig. *c*), which is about the size of a flax-seed. This sack is connected by a tube (Fig. *m*) with the reservoir of the sting. The sting is a triple organ consisting of three sharp hollow spears, which are very smooth and of exquisite polish. If we magnify the most beautifully wrought steel instrument it looks rough and unfinished; while the parts of the sting, however highly magnified, are smooth and perfect. The true relation of the three parts of the sting was accurately described by Mr. J. R. Bledsoe in the American Bee Journal, vol. 6, p. 29. The action in stinging and the method of extruding the poison is well described in a beautifully illustrated article by Mr. J. D. Hyatt in Vol. I., No. 1, of "American Quarterly Microscopical Journal." The larger of the three awls (Fig. *a*), usually, though incorrectly, styled the sheath, has a large cylindrical reservoir at its base (Fig. *s*) which is entirely shut off from the hollow (Fig. *h*) in the more slender part of the awl, which latter serves no purpose, except to give strength and lightness.

The reservoir connects at its base with the poison sack and below by a slit with the opening (Fig. *n*) made by the approximation of the three awls.

The other two awls (Fig. *b*, *b*, *b*), which we will call lancets, are also hollow (Fig. *i*, *i*). They are barbed (Fig. *u*, *u*, *u*) much like a fish-hook, except that there are eight or ten barbs instead of one. Five of the barbs are large and strong. These barbs catch hold and cause the extraction of the sting when



Sting with Lancets drawn one side, cross-section of Sting and a Lancet, much magnified.

c—Poison sack.
m—Tube from sack to reservoir.
s—Reservoir.
a—Awl.
b, b—Lancets.
e, e—Valves.
o, o—Opening from hollow in lancet.
u, u—Barbs.
h—Hollow in awl.
i, i—Hollows in lancets.
t, t—Ridges in awl.
t'—Groove in lancet.

the organ is used. Near the base of each lancet is a beautiful valvular organ (Fig. *e, e*). The hollow inside the lancets (Fig. *i, i*), unlike that of the awl, is useful. It opens anteriorly in front of the first six barbs (Fig. *o, o*), as shown by Mr. Hyatt, and posteriorly just back of the valves into the central tube (Fig. *n*), and through it into the reservoir (Fig. *s*). The poison then can pass either through the hollow lancets (Fig. *i, i*) or through the central tube (Fig. *n*) between the three spears.

The lancets are held to the central piece by projections (Fig. *t, t*) from the latter, which fit into corresponding grooves (Fig. *t'*) of the lancets. In the figure the lancets are moved one side to show the barbs and the valves. Normally they are held close together, and thus form the tube (Fig. *n*).

The parts of the sting are moved by muscles connecting the bases of the parts and extending from the parts to the large chitinous supports (fig. *d*). The fact that muscles connect the various parts, and the muscular character of the sack, explain how a sting may act, even after the bee is apparently lifeless, or what is even more wonderful, after it has been extracted from the bee. The barbs hold one lancet as a fulcrum for the other, and so long as the muscles are excitable so long is a thrust possible. Thus I have known a bee dead for hours to sting. A wasp, dead more than a day, with the abdomen cut off, made a painful thrust and stings extracted for several minutes could still bring tears by their entering the flesh.

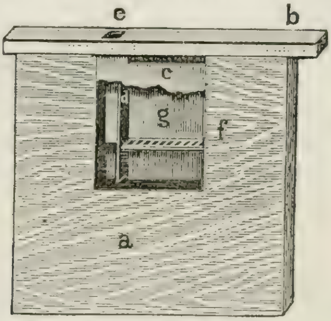
In stinging, the awl first pierces, then the lancets follow. As the lancets push in, the valves close the central tube, when the poison is driven through the lancets themselves and comes out by the openings near the barbs (Fig. *o, o*). The drop of poison which we see on the sting when the bee is slightly irritated, as by jarring the hive on a cold day, is pushed through the central opening by the muscular contraction of the sac attendant upon the elevation of the abdomen, and extrusion of the sting.

Darwin suggests that bees and wasps may have been developed from saw-flies, and that the barbs on the sting are the old-time saws, transformed into barbs.

DIVISION-BOARD FEEDER.

BY PROF. A. J. COOK.

The requisites of a good feeder are: Cheapness, a form to admit quick feeding, to permit no loss of heat, and so arranged that we can feed without in any way disturbing the bees. The feeder (see engraving) which I have used with the best satisfaction, is a modified division-board, the top-bar of which (*b*) is two inches wide. In the cut the lower part of the face of the can is removed to show float, etc. From the upper central portion, beneath the top-bar, a rectangular piece the size of an oyster-can is replaced with an oyster-can (*g*), after the top of the latter has been removed. A vertical piece of wood (*d*) is fitted into the can so as to separate a space about one inch square, on one side from the balance of the chamber. This piece does not reach quite to the bottom of the can, there being a one-eighth inch space beneath. In the top-bar there is an opening (*e*) just above the smaller space below. In the large space is a wooden float (*f*) full of holes. On one side, opposite the larger chamber of the can, a half-inch piece of the top (*c*) is cut off, so that the bees can pass between the can and top-bar on to the float, where they can sip the feed. The feed is turned into the hole in the top-bar (*e*), and without touching a bee, passes down under the vertical strip (*d*) and raises the float (*f*). The can may be tacked to the board at the ends near the top. Two or three tacks through the can into the vertical piece (*d*) will hold the latter firmly in place; or the top-bar may press on the vertical piece so that it cannot move. Crowding a narrow piece of woolen cloth between the can and board, and nailing a similar strip around the beveled edge of the division-board makes all snug. One of our students suggests the name "Perfection," for this feeder. The feeder is placed at the end of the brood-chamber and the top-bar covered by the quilt. To feed we have only to fold the quilt over, when with a tea-pot we pour the feed into the hole in the top-bar. If a honey board is used, there must be a hole in this just above the hole in the division-board feeder. In either case, no bees can escape, the heat is confined, and our division-board feeder is but little more expensive than a division-board alone.



The best time to feed is just at nightfall. In this case the feed will be carried away before the next day, and the danger to weak colonies from robbing is not so great.

It will always pay richly to feed bees whenever they can gather no honey for several days in succession. We thus keep the queen active.

In feeding during the cold days of April, all should be close above the bees to economize the heat. In all feeding, care is requisite that we may not spill the feed about the apiary, as this may, and very generally will, induce robbing.

Lansing, Mich., April, 1879.

SALT IN AGRICULTURE.

BY DR. R. C. KEDZIE, PROF. OF CHEMISTRY AT THE MICHIGAN AGRICULTURAL COLLEGE.

We have the best authority for saying that "salt is good." Its universal use by men in all stages of civilization, the eagerness with which it is sought by animals, not only when domesticated, but in their native wilds, as well as its general distribution over the globe, show that it is adapted to supply a general want. When men are deprived of an adequate supply of salt the evil is sorely felt. During the late rebellion in the Southern States, the supply of salt for the people became a question of pressing importance, requiring most careful consideration and governmental supervision. I have seen bearded men come into our camps and seek for salt as eagerly as children for candy. In some districts of Africa salt is a most precious substance, a handful will buy a slave, and to say of any one that he eats salt with his daily food is evidence of his luxurious wealth.

The use of salt as a manure dates from early antiquity. Its sterilizing influence when used in large quantity was also early known; since eastern conquerors, when they would indicate the final overthrow of a captured city, were accustomed to raze its walls, plow up its streets and sow the place with salt.

When we study the modern use of salt as a manure, and read the agricultural journals on this subject, we plunge into the midst of "confusion worse confounded." One class represent salt as a manure of great value to every kind of crop, on every kind of soil, and that it may safely be used in very large doses. Another class, that it is no benefit to most crops, detrimental to some, and that the soil naturally contains enough salt for the wants of any crop.

It is singular that we should find such a diversity of views on this subject among some of the most intelligent agriculturists. If we look into the matter closely we may find an explanation of this diversity of views respecting the manural value of salt in the climate, geographical position, or kind of soil, of these respective parties. If salt is beneficial in a hot and dry climate, then a person living in a cool and moist climate would receive little benefit from its use. The sea spray carried by the winds to great distance inland supplies a quantity of salt every year to the fields. A friend whose home was in the Shetland islands told me that after every storm her windows had a frosting of salt which required to be washed away. The rain water near the seacoast has a sensible amount of salt, but as we recede from the coast the amount rapidly diminishes. According to Dr. Robert Angus Smith, if we take the amount of chlorides at Valentia, in Ireland, at 100, the amount in Manchester is only 12, and in Darmstadt, Germany, is only 2. A farmer in Ireland may find no benefit from the use of salt as a manure, while a farmer in Germany whose fields receive only one-fiftieth as much salt in his rainfall, may receive marked benefit from the use of salt on his fields. Sandy soils may be greatly benefited by the use of salt where heavy clay soils would receive no benefit, but perhaps positive injury.

At a distance from the sea, on sandy soils, and with certain kinds of crops, we find that common salt is esteemed as a manure. Where the high price of land demands high farming and abundant manuring, the use of salt is mainly determined by the cost, and a government tax on salt is deplored because it bears oppressively upon agriculture by limiting this use of salt as a manure.

OVER-PRAISE.

Like every other really valuable special manure, salt has been over-praised and its use recommended without proper discrimination. Like plaster, it has been by some persons recommended as a universal manure, capable of replacing all other manures, good for every crop, upon every kind of soil, and in every season. But the reputation of salt has been injured by such indiscriminate praise, and its use has been restricted rather than extended thereby, because failures are long remembered and more generally made known than successful experiments.

GENERAL INVESTIGATIONS.

One reason why salt has received so little notice by writers on theoretical agriculture is in consequence of some extended investigations by German chemists into the nature and action of ash-food of plants, in which they have endeavored to ascertain what elements of the ash of plants are "essential" and what are "accidental." In the ash of all plants grown under agricultural conditions we find potash, soda, lime, magnesia, oxide of iron, silica, sulphates, phosphates, and chlorides. The German chemists asked this question: "Are these materials, each and all, necessary for the growth of the plant, or can plants live and grow in the entire absence of any one of this list?" For the last twenty years very elaborate investigations have been made to answer this question.

For a long time the fact that any given substance was always found in the ash of a plant was accepted as a proof that it was necessary for the growth of that plant and that it could not live without it. But this did not satisfy the German chemist, who wanted stronger proof than uniform presence, of the absolute necessity of a given material for plant life.

You will bear in mind the fact that the problems they proposed for solution are very different from those that would attract the attention of the practical farmer. Their investigations had relation solely to the abstract theory of plant life, and the question whether any given substance would increase the production of any crop scarcely attracted their attention. The chemist found a certain list of chemical substances always present in the ash of plants grown under natural conditions, and the question he proposed was this: are all of these substances essential for the life of a plant, or can the plant make complete growth (*i. e.*, grow from the seed and again ripen seed) in the entire absence of any one of the substances usually found in the ash of plants? When all the physical conditions of plant growth are present, and all the ash element except one furnished the young plant, if the exclusion of this one element is uniformly attended by an unhealthy condition and ultimate failure of the plant, then such substance is said to be "essential" for the life of the plant. Thus no plant will grow in the entire absence of potash, lime, magnesia, phosphoric acid and sulphuric acid, and these substances are essential for the plant life. But if a plant can grow and ripen seed in the entire absence of another ash element, then such substance is excluded from the list of essential ash elements, no matter how much its presence may increase the vigor of growth and development of the plant grown under natural conditions, or how much of the substance is usually found in the ash of such plant. The chemist simply asks, "Will the plant live and ripen seed?" while the farmer asks, "How large will it grow?"

ESSENTIAL AND ACCIDENTAL ASH ELEMENTS.

The question whether the substance was essential to plant growth could not be settled by growing plants in ordinary soils, because the "essential" and "accidental" ash elements are found associated in every fertile soil. To answer this question we must place a plant in a soil or medium for growth from which the substance under consideration is rigidly excluded. For this purpose Prince Salm-Horstmar, of Germany prepared an artificial soil, composed of powdered flints, purified sand, and charcoal made by burning loaf-sugar. To this soil, containing nothing but silica and carbon, he added all the usual ash elements save one, planted the seed of some plant, supplied all the physical conditions of plant growth, and then watched the results. Each one of the ash elements in turn was excluded in his experiments.

WATER CULTURE.

Later investigators have dispensed with a soil altogether, and raised plants by "water culture." The seed is sprouted in damp cotton or between folds of wet paper till the roots are well developed, when the plant is suspended so that only the roots dip into water which contains in solution or suspension the ash elements to sustain the plant. By careful treatment plants have been grown to large size and full development by water culture. In this way one ash element after another has been excluded from the nourishing solution, and the results carefully watched. While potash, lime and magnesia were essential for the development of a plant from a seed, the question arose whether soda was essential. Prince Salm-Horstmar, as the result of numerous experiments upon wheat, oats and barley, concludes that in the early vegetative stages of growth, soda, while advantageous, is not essential, but that for the perfection of the seed an appreciable though a minute quantity of soda is indispensable. On the other hand, several experimenters have succeeded in bringing maize to complete perfection by water culture in which no soda salts were used, and they claim that soda is not essential. Yet no one has raised a plant in which soda was not found in some part. All admit that chlorine is essential for ripening the seed of some plants, such as buckwheat.

When the German chemists exclude soda from the list of "essentials" for plant growth, are we to conclude that it is therefore of no value in agriculture? A farmer has a long list of implements which are not essential for farming, because farming has been, and may still be, carried on without them; the mower and reaper, the horse-rake, the cultivator, the roller, and a score of other things are not essential to farming, but the farmer does not discard them on that account, because he can raise enough more on his farm with these implements to more than pay for their use. In the same way do not reject salt as a manure, as many writers on theoretical agriculture have done, simply because, in a narrow and limited sense, it is not essential to plant life. It may be very beneficial even if it is not essential to plant growth. This brings us face to face with many important questions in regard to salt as manure. Is salt beneficial to crops? What crops are benefited? Upon what kind of soil is salt most beneficial? What are the views of our best farmers in regard to the use of salt? How does it benefit crops? This is a long string of questions, and I do not expect to fully answer any of them.

IS SALT BENEFICIAL TO CROPS?

The fact that many crops contain a large amount of salt is a presumption that it is beneficial to such crops. Nature does not usually blunder in her operations, and some of our best results come from following her lead. If we turn to the records of careful experiments made in England and in Germany, we find ample proof that salt is beneficial to many crops. Professor J. F. W. Johnston says: "It is certain that common salt has in very many cases been advantageous to the growing crop." He then quotes the results of experiments in which wheat dressed with salt gave an average of eight bushels more than the same kind of soil produces without salt, barley gave an increase of 21 bushels an acre, and hay one ton increase to the acre. The experiments of John Hannam, of England, as detailed in an essay on manures, for which he received a prize of £50, show a large increase by the use of salt in the acreage production of barley and oats, and a moderate increase in the yield of wheat.

In 1864 J. B. Lawes, of Rothamsted, read a paper before the agricultural council, to show that salt had practically no influence on his farm in increasing or diminishing the production of either straw, grain, or wheat. In the discussion which followed, a number of persons spoke, and all in opposition to the views of Mr. Lawes. Mr. Hooker gave the result of some experiments with respect to the influence of salt on wheat, in which he showed that one portion of his wheat-field dressed with four cwt. of salt gave 30 bushels of wheat to the acre, of good quality, while the balance of the field, without salt, gave 20 bushels to the acre, of second quality.

Morton's Cyclopedia of Agriculture says: "Common salt has been employed in all ages and in all countries for the purpose of promoting vegetation, and has been specially useful in inland countries. In some districts it has failed to produce any beneficial effects upon the growing crop, and has consequently suffered in the high estimation in which it was held in England about a century ago. Still, salt is largely employed for manuring purposes, and there can be little doubt that in many cases it produces a sensible improvement in various crops. Its use has been particularly recommended for the cereal crops."

But I will not quote further from English sources, but turn your attention to reports of the use of salt in this country.

In quoting current opinions and experiences on the use of salt, I turn for convenience to a volume of the Country Gentleman, because it has a good index, and I quote the writers nearly in the order they appear in print. The first is from W. C. Fish of Onondaga county, N. Y. "In experiments for the past four years, I find many advantages in sowing salt on spring wheat. For over 25 years' farming on soil too hot and dry for spring wheat to fill well (in the usual manner of cultivation), it proved a very uncertain crop. Becoming nearly discouraged in trying to raise it, I began four years ago sowing salt. The first year three bushels were scattered on the ground, just as the wheat was fairly up and the ground dry. Twenty-five bushels per acre was the first year's yield. The second year four bushels of salt were sown, and twenty-nine bushels of plump wheat were raised to the acre. The third experiment was four bushels of salt and thirty of wheat to the acre. For the past summer in

Onondaga county the thermometer has marked 80 degrees and upwards for 38 days, 15 of which were over 90 degrees; and it was a scorching time for spring grain. For the last trial I drilled, on six acres of corn-stubble ground, one and three-fourths bushels of wheat, and sowed six bushels of salt broadcast to the acre. A strip was left without any salt, which was very light; on this ground the dew dried off quicker and the wheat headed out two days later, with the straw darker colored and badly crinkled down." [Vol. XLII., p. 4.

"The statements of your correspondent, Mr. C. W. Fish, in your number for January 4, prompts me to say what I have for some time intended to do, to wit, that the application of salt upon grain crops is a growing practice in this country. A very considerable demand for salt for this purpose has been established in our southern towns. Dirty salt, or that of an inferior quality, is as efficient as any, and comes cheaper. It is applied at the rate of from one to three bushels per acre upon barley, wheat and oats. One bushel of salt is good for three or four bushels of grain. The best results were formerly realized when salt was sown on barley, the production being increased several bushels. If sown pretty freely, say three or four bushels per acre, the benefits are visible for several seasons. The experiments of S. M. Brown several years ago showed that the application of salt on winter wheat was obviously advantageous. The effect seemed to be seen in the stiffening of the straw, by which its falling down and rusting, thus shrinking the berry, was prevented. If the effect upon spring wheat is what Mr. Fish represents it to be, all central and western New York can go into the production of that variety and make it profitable. If we can raise 30, 25 or even 20 bushels of spring wheat to the acre at an expense of 10 or 13 shillings for a fertilizer, Minnesota and other western States, where the average yield only comes up to six or eight bushels, would soon find us formidable competitors in the eastern markets.

For a long period salt has been used to a large extent on the growing crops in Great Britain. It has been there ascertained that 16 bushels per acre will kill all kinds of vegetation. Eight bushels per acre may be safely applied. From two to four bushels per acre would probably insure sufficiently favorable results in this country. There can be no doubt that the farmers would obtain valuable returns from the use of salt upon their grain crops." [S., Syracuse, N. Y., p. 83.]

SALT IN CANADA.

Having seen a communication in your last issue upon the application of salt as a manure, I fully endorse the good results from its use as expressed by your correspondent. In Branch county, where I reside, its non-application will soon be the exception and not the rule, as the material benefit accruing to those who have used it is such as to make us feel that our success in growing good crops, particularly barley, depends to a considerable extent upon its application. Experiments have been tried, such as leaving strips in a field without any salt, resulting in such a contrast as to cause any one not knowing the facts to wonder at it. * * * * [W. B. U. (p. 115).

SALT AS A FERTILIZER.

Seeing an article in your paper of February 8th in regard to salt as a fertilizer, I will give my experience in regard to it. Two years ago I sent to Syracuse for one ton of refuse salt washings, which cost me at my nearest railroad station $7.10, and as it was rather lumpy and moist to drill, I pulverized it on my barn floor, and mixed with the salt as much hardwood ashes as I had salt.

May 20th I drilled in my barley, and with the phosphate arrangement, sowed about 250 pounds of the above mixture per acre, and the result was I had a good piece of barley, with a very plump berry and bright straw. The farm I had just purchased that spring, proved to have been run considerably, and the neighbors and passers-by would often ask what I had been doing to my ground that made the barley look so rank.

* * * * * * * * * * * * * *

My neighbor, Mr. L., is a great advocate of phosphate, and I requested him to try a ton of refuse salt washing on his barley ground. He sowed three bushels of salt per acre on the furrow and harrowed it in. On the rest of the field he used the Buffalo phosphate. Where the salt was used, previous to that time the grain was always flat to the ground, but after the salt was used the grain stood up; was one week earlier than the phosphated barley, and he told me if a man had been blindfolded, and set to putting up the grain, he could have told when he came to the part of the field where the salt was used, as the grain was so much heavier than where phosphate was used. I have sowed refuse salt on corn ground, before harrowing, with good results; but never drop it in the hill with the corn, I prefer the refuse salt washings to the refined salt for agricultural purposes, and intend to try some more this spring. [E. L. B., King's Ferry, N. Y., p. 147.]

SALT FOR SPRING CROPS.

Many farmers in some towns of this country are using salt on oats and barley this spring. * * * Salt has been used considerably on winter wheat, and with good results, but it is believed to be even better on spring grain, the advantage is greatest in dry seasons, and where sown with wheat. Winter snows and rains always intervene before the grain heads. It is found that salt makes the straw of all grain brighter, and the berry plumper. It is claimed especially for its use on barley, that it makes the grain fill more slowly in hot and dry weather.

At a meeting of the Western New York Farmers' Club, May 2d, S. Reed and D. E. Rogers said that salt had proven fully as beneficial to all crops except clover, as gypsum. * * * * * Salt also, like gypsum, appears to be often of more benefit to crops than we could infer from its constituent elements. Uudoubtedly salt dissolves certain kinds of plant-food and makes it more available than it could be otherwise. I know, however, that its benefits extend to the second year, as it does nearly as much good to the grass as to the preceding grain crop. [W. L. F., Monroe County, N. Y., p. 300.]

SALT AS A FERTILIZER.

I am aware that learned professors have written on this subject, viewing the matter in a scientific light, and in nearly, if not in every case that came under my notice, concluded a long article by leaving the matter in as great doubt as ever. So far as the writings upon this subject are concerned, it would appear to be a matter of doubt whether or not salt is a valuable fertilizer, or in fact I might almost say a fertilizer at all, and experiments on the subject are considerably divided. I have experimented for many years with salt, and tested it on the various cereals and roots, and on the different soils, from the stiff clay to the light reddish sand, and the results have been quite as varied as the experiments themselves. To enumerate the individual experiments would take up too much space, but a few general remarks and results may be of some interest to the thinking agriculturists.

It is pretty well known that this section of the world is one of the great salt cultures, and therefore experimenting has the great advantage here of being (in this article) cheap. On heavy clay land I have found little use in salt dressing, but with an addition of unleached ashes, in quantity about fifty bushels of ashes to ten of salt on each acre, I have taken a third more of a root crop, and the quality of such roots is always superior. On light soils salt alone has with me always proved beneficial; but even here I have had the largest returns where ashes were used in connection with salt. * * * In excessive drouth I have found a mixture of salt and ashes to act like a charm, evidently keeping a living moisture near the surface, whereas, parts where the mixture was not used were dry as dust for several inches in depth. * * * Potatoes grown on salted land are always clean and free from scab, and not so subject to dry rot, I think. I have had a half acre planted with Scotch kidney potatoes, one-half of which was dressed heavy with salt and ashes and the other half left without the mixture, and the result for several years was that on the dressed half the potatoes were clean and the crop rather a better average in maturity than on the other half on which the potatoes were, as is usual with this variety, covered with scab. These are a few of the results I have had on this "uncertain subject." * * * [Lahrax, Goderich, Ont. (p. 791).

EXPERIMENTS AT THE AGRICULTURAL COLLEGE.

Experiments were tried to determine the relative value of plaster, muck and salt, as compared with stable manure, in the growth of grass for hay during the years 1864–5–6. The soil for these experiments was a light sandy loam, which appeared to be of uniform fertility. It was divided into eight plots of same size; one was left without manure, to show the natural productiveness of the soil; the dressings for the other plots, and the amount of hay for each cutting is exhibited in the following

TABLE OF RESULTS FOR 1864.

No. of Plot.	MANURE ON EACH ACRE.	PRODUCE PER ACRE.				TOTAL RESULT PER ACRE.	
		First Cutting.		Second Cutting.		Pounds of hay.	Gained by use of manure.
		Lbs.	Gain.	Lbs.	Gain.		
1	No manure	2,856	....	1,742	....	4,598	....
2	2 bu. of gypsum	3,917	1,061	3,056	1,314	6,973	2,375
3	5 bu. of ashes	4,515	1,659	2,977	1,235	7,492	2,894
4	20 loads of muck	4,566	1,710	3,306	1,564	7,872	3,274
5	3 bu. salt, 20 loads muck	4,696	1,840	2,975	1,233	7,671	3,073
6	3 bu salt	3,813	957	2,467	725	6,280	1,682
7	20 loads horse dung	3,708	842	2,678	936	6,386	1,778
8	20 loads cow dung	3,931	1,075	2,856	1,114	6,787	2,189

The results for 1865 on same plats, but without renewal of manure, to determine the influence of these dressing on subsequent crops is given in

TABLE OF RESULTS FOR 1865.

No. of Plot.	MANURE TO EACH ACRE IN 1864.	PRODUCE PER ACRE.				TOTAL RESULTS FOR YEAR.	
		First Cutting.		Second Cutting.		Pounds of hay.	Gain by manure.
		Lbs.	Gain.	Lbs.	Gain.		
1	No manure	1,867	....	889	....	2,756	....
2	2 bushels gypsum	2,933	1,067	1,600	711	4,533	1,778
3	5 bushels ashes	2,644	778	1,169	280	3,813	1,058
4	20 loads muck	2,978	1,111	1,187	298	4,164	1,409
5	3 bu. salt, 20 loads muck	3,644	1,778	1,356	467	5,000	2,245
6	3 bushels salt	3,511	1,645	1,748	858	5,258	2,503
7	20 loads horse dung	3,844	1,978	2,157	1,267	6,000	3,245
8	20 loads cow dung	3,311	1,445	2,133	1,245	5,444	2,689

TABLE OF RESULTS FOR 1866.

No. of Plat.	MANURE TO EACH ACRE.	PRODUCE PER ACRE.		
		First Cutting.		Second Cutting.
		Kbs.	Gain.	
1	No manure	1,389	....	The second crop was not cut in 1866.
2	2 bushels gypsum	1,720	331	
3	5 bushels wood ashes	1,602	213	
4	2 loads muck	1,780	391	
5	3 bu. salt, 20 loads muck	2,158	769	
6	3 bushels salt	2,431	1,042	
7	20 loads horse dung	2,600	1,211	
8	2 loads cow dung	2,433	944	

TABLE SHOWING TOTAL RESULTS FOR THREE YEARS—1864-5-6.

No. of Plat.	MANURE TO EACH ACRE.	Pounds of hay.	Gain by manure.
1	No manure	8,744	....
2	2 bushels gypsum	13,226	4,482
3	5 bushels wood ashes	22,907	4,163
4	2 loads muck	13,816	5,072
5	3 bushels salt, 20 loads muck	14,829	6,085
6	3 bushels salt	13,969	5,225
7	20 loads horse dung	14,986	6,242
8	2 loads cow dung	14,564	5,820

The final summary of these experiments from which it appears that three bushels of salt in the three years gave an increase of 5,225 pounds of hay to the acre, and three bushels of salt with twenty loads of muck gave an increase of 6,085 pounds, tells in a striking manner the influence of salt on the hay crop on light soils.

SALT IN MASSACHUSETTS.

In 1869, Prof. Goessmann gave a lecture before the State Board of Agriculture at Pittsfield, Mass., on "Salt and its Uses in Agriculture." Prof. Goessmann closed his lecture as follows: "The safest and cheapest way of supplying salt to your farm lands, if at all desirable, is to feed it to your live stock, for natural channels of distribution are always the best." You will see from this that Prof. G. does not take much stock in salt for manure. Perhaps it was because he lived near the ocean. Col. Wilder, who lives near the sea, considers salt useless. In the discussion following the reading of this address we find Mr. Goodman, of Berkshire county, speaking as follows: "Now as to this matter of salt. As the professor has told us, there is no question that it was used centuries ago as a manure, by men who thought themselves as wise as we are—the Greeks and Romans—with decided advantage Our agricultural histories tell us that among the ancients it was one of the most valuable manures. When you get among the hills as far from the ocean as ours, you will find salt a valuable manure. But you must not use it on a field as you would on an asparagus bed. No one would use guano as he would use other manures. You cannot use superphosphates as you use any other manure. You cannot use any mineral manures as you use barnyard manures. They must be used with great caution. Take a country like this where oats are a valuable crop, one of the greatest complaints among farmers is that they do not stand up. If you apply salt you will find that your oats will not fall down. When salt is properly applied to our soils you will find that a stiffness is given to the grain, and that it is beneficial in that respect." [Ag. Mass., 1869, pp. 56 and 57.]

Mr. Beebe, of Benton: "I have used salt, from a bushel to three bushels to the acre, with good success on oats, potatoes and wheat. Grass is very much improved by the application of salt as a top dressing when the land is seeded down. * * * Take one bushel of salt and three bushels of marl and let it lie four months under a shed, and then add five bushels of this compost to a cord of muck, and I warrant you one of the best manures that was ever made in Berkshire county, for all your sandy land. That is a recipe Prof. Mapes gave my brother for $20, and he tried it on sandy land near West Stockbridge, ten or fifteen years ago, and that land still produces double the quantity of grass that is yielded by the same quality of land adjoining. * * * I have used salt on land that I planted with oats, and find it very beneficial in stiffening the straw, as well as in increasing the weight of grain. It raised my oats six inches above the crop standing side by side, with the same cultivation, except the application of salt."

M. Butler—I believe that salt on our Berkshire land is decidedly beneficial. Col. Wilder undoubtedly will tell me that his animals require little or no salt running at large in his fields.

Col. Wilder—Not a bit.

Mr. Butler—I thought you would say so, sir. Now, my animals, and those of every other Berkshire man, eat salt with the same avidity that they would meal or grain, once or twice a week. [Pp. 59 and 60.]

Dr. Loring—You had a lecture here, I understand, on salt. I wish I had heard it. I believe in salt for certain crops, implicitly. Prof. Stockbridge talks about five bushels to the acre. I have put thirty bushels to the acre for a crop of mangolds, and never got a better crop in my life. Any farmer will tell you that the mangold is a great feeder on salt, or else the salt produces such an effect upon the manure that it enables the mangold to take it up. Put into those drills well decomposed manure, provided with a certain supply of salt, the refuse of the beef-packers or salt fish dealers; any kind of salt will answer the purpose. We used to buy it for six or seven cents a bushel; you cannot get it as cheap now; but get it as cheap as you can and put it in. Then have those drills smoothed a little on the top, and sow your seed as early as you can. Be sure and have it well covered. * * * You can get a crop of from 1,000 to 1,200 bushels to the acre. Much larger crops have been raised. [Pp. 165–6.]

In the meeting of the Massachusetts State Board of Agriculture at Pittsburg, in 1874, Mr. Lewis, of Herkimer county, N. Y., was invited to speak on root culture. He said: "I have been using some of the refuse salt from the salt works at Syracuse, this year, and I think that for every four or five bushels sown, I have got ten additional tons of beets. I have sown about four or five bushels per acre of this refuse salt, and as near as I can estimate, the difference between the crop when it was sown and when it was not, it has given me just about ten tons per acre. It is wonderful. I do not know that it would ever do it again. [Report of Agriculture of Mass., 1873, 14, pp. 318–9.]

In the 28th volume of Transactions of N. Y. State Agricultural Society, Geo. Geddes has an essay on salt. Relative to the expediency of using salt as a manure, experiments are mentioned with diverse and sometimes opposing results. This is doubtless owing to the variations in quantity used, the manner of using it, and difference in composition of the soils on which it has been tried. After weighing all the facts in the case, Mr. Geddes comes to the following conclusions: "Some soils have enough salt in them, and more does injury. English farmers scatter salt over their fields at the rate of two two bushels per acre, with success, and this quantity may be enough. Some men have greatly puzzled themselves over the fact that light dressings are beneficial, while heavy ones do positive injury, and those have finally said, as in small quantities is known to accelerate the putrefaction of ancient substances, and when in larger doses to retard it, and thus is useful in assisting the organs of digestion in men and carnivorous animals. * * So it may aid in reducing vegetable matter in the soil into food for plants, if applied in small quantities. [Report of Dep. of Agriculture, 1870, p. 495.]

It need not excite our wonder that lands along the sea coast should not receive any benefit from the salt applied as manure, when Dr. Madden informs us that "rainfall at Penicuik contains so much common salt as to convey 640 lbs. to every acre in the year." [Johnston's Elm. Agric. Chem., 5e., p. 216.]

This is an extreme case, and the average of rain on the sea coast does not contain so much salt. It is only quoted to show that a considerable amount of salt is carried to the land in rain. Such lands may be found along the sea coast, and where salt springs appear. Other lands are greatly benefited by light dressings of salt.

BENEFITS CLAIMED FOR AGRICULTURAL USE OF SALT.

A very large number of persons claim that salt is a benefit to oats and barley by strengthening the stalk and preventing the grain from lodging, brightening the stalk, making the berry plumper and brighter, and by increasing the amount of grain as well as improving the quality. It is claimed that mangolds, beets, cabbages, asparagus, and the other class of sea coast plants are greatly benefited by manuring with salt. Mr. Ware, in the Massachusetts report for 1877, says: "Salt is a very valuable fertilizer for onions, for carrots, for mangolds and for cabbages. I do not know that I should recommend it for other crops especially. We, in Essex county, use a great deal of salt manure in raising onions, but I do not think that salt is so especially adapted as a fertilizer to onions as to the three crops I have mentioned—carrots, cabbages and mangolds."

On winter wheat salt has been used, but reports of its influence are conflicting; in many instances the increased growth of straw, and the quantity and quality of grain are surprising; in other instances no benefit was observed. We need careful experiments and close observation to detect the grounds of such disparity in reported effects of salt on wheat.

Salt has been used with Indian corn to kill the cut worm, but he is a tough-skinned worm, and will often withstand an amount of salt that will kill the corn.

In the Journal of the Royal Agricultural Society for 1866 there is an article by Dr. Voelcker, "Field Experiments on Clover Seeds," giving results of experiments with various mineral manures on clover meadows. Dr. Voelcker comes to the conclusion that salt is not beneficial to clover—that under its influence clover will disappear and grasses take its place.

Mr. Bowditch, in an article on "Manuring Grass Land," in Vol. XIX. of the Journal of the Royal Agricultural Society, says: "Common salt is included in every manure here recommended, because experience has shown its beneficial action upon grass whenever it has been properly applied." [P. 241.

HOW IS SALT BENEFICIAL AS A MANURE?

Since soda, if essential in plant growth, is only required in small amounts, and chlorine, though essential for most plants, is still required in only small amounts, and common salt is found in minute quantity in most soils, chemists have asked why salt should be of any benefit as a manure, and from theoretical grounds have been disposed to deny that salt has any value as manure. Yet practical farmers, not having the fear of science before their eyes, have pointed to the increased crops and asked, "How is that?"

There can be no conflict between practice and science, because science is the classified explanation of practice. I have said enough to show that it is not enough to cause the rejection of a substance as manure to say that it is not "essential" to plant growth.

Let us see what explanation can be made of the use of salt in agriculture beyond the small amount required for the ash element.

Prof. May showed that solution of salt would render soluble the ammonia which had entered into insoluble condition in the soil.

Prof. Atwater, in the Conn. Report for 1873, says: "Something has been said about the use of ordinary salt as a fertilizer. One important office of the salt is to make soluble and consequently useful to the plant, the materials already locked up, as it were, in the soil. Supposing you have been putting on barnyard manure and other fertilizers. Some of the nutritive materials, as for instance potash and phosphoric acid, may perhaps have been taken up by the soil, and remain there in a difficultly soluble condition. Furthermore there are in the soil some of these ingredients that were in the original rock of which the soil is made up, and are still, so to say, locked up, or in other words still remain in an insoluble form therein. One effect of salt, as is the case oftentimes with gypsum and lime, is to set loose that potash and phosphoric acid. You must expect, therefore, in putting on salt, that its chief use will be, not as a direct nutriment to the plant, but rather as a means of setting other materials loose; and salt is very useful on this account, because it is not readily absorbed in the upper layers of the soil, but often leaches through into the lower layers; and it will have the effect of setting these materials free all the way down. The German farmers say, however, that you must be careful in the use of salt. If you put on too much it injures the vegetation. Further, it will not do to put it on loose soil. A very loose, sandy soil is not ordinarily benefited by the application of salt. Again, it is best applied to soils which contain considerable humus. And, finally, it should be used on soils which are in pretty fair condition as regards the contents of fertilizing elements. On soils which are not too loose, which have a good amount of humus, and which are in pretty fair condition as regards the amount of fertilizing material, organic and inorganic, contained in them, it is oftentimes a good thing to apply salt.'' [Pages 229–30.]

I here present some extracts from an article by Dr. Voelcker, ''On the Functions of Soda-salts in Agriculture.'' ''It is true we find soda-salts, more especially common salt, in almost every kind of agricultural produce, and their presence is commonly regarded as a proof that they are absolutely necessary for the very life and growth of our cereal and forage crops. The mere presence of certain constituents in plants does not, however, prove that these constituents are indispenable. Such a conclusion is only established when the withdrawal of one or more elements of nutrition or the substitution of others in their place, is marked uniformly by an unhealthy growth and final failure. * * *

''On the other hand, the fact that mangolds or grass contain a good deal of common salt when the soil on which they are grown is naturally rich in salt or has received a good dressing of it, does not by any means prove that salt is necessary. * * *

''Although I do not look upon chloride of sodium and soda salts in general as essential ash constituents of plants, I am far from denying the beneficial effect which salt is capable of providing in particular cases. Indeed my own experience leads me to admit that salt is a useful and cheap manure, which, judiciously applied, frequently yields a large increase of corn, roots, or hay and seldom does any harm.

''On porous, sandy soils, roots, especially when the season happens to be dry, are apt to pass so rapidly through all the stages of growth that their leaves begin to drop before they have had time enough on the one hand to collect atmospheric food, and on the other to accumulate mineral matter from the soil in sufficient quality for the development of an abundant crop of bulbs. On such soils the application of one cwt. has given me a large increase in roots, and seven, eight or even nine cwt., so far from doing any harm, increased the product of mangold by 2½ to 4 tons per acre. On the other hand, it does mischief where it is applied in excessive doses to stiff, wet, clay soils, and soils generally which are cold, and bring their grain, root, and grass crops slowly to maturity, for salt has a remarkable tendency to prolong the period of vegetation and delay the arrival of maturity. * * * * * *

''As common salt certainly has the power of prolonging the period during which our cultivated crops can be kept growing in the field, much advantage can be derived from its use by the intelligent agriculturist, who, bearing in mind the circumstances under which it is desirable to prolong the life of plants, will chiefly employ it as a top dressing or otherwise where he has to do with light, porous, and naturally dry soils.

''It will be seen that the value of a fertilizing agent does not always depend upon the fact that it is an essential element of nutrition; the substance which we apply to the land with a view of increasing our crops may have no value whatever as a direct fertilizer, and may, as in the case of chloride of sodium, not even make its appearance in our grain crops, and yet it may be instrumental in materially raising the produce of wheat.

"Again, such non-essential salts in general may nevertheless play an important part in the nutrition of plants by assisting the solution and uniform distribution of fertilizing constituents which occur in the soil in a sparingly soluble or insoluble condition. It is well known to chemists that chloride of sodium exercises a dissolving action upon sound bodies, and thus it is not too great a stretch of fancy to assume that it will act beneficially in the field by dissolving and rendering available earthy fertilizing constituents which without its aid will remain in an inert condition for a long time." [Journal Royal Ag. Soc., 2d series, Vol. I., p. 299, 302.

The fact so clearly pointed out by Prof. Voelcker, that salt has a marked tendency to prolong the period of vegetative growth and thus to prevent the premature ripening of leaf and consequent arrest of development of the bulbs of root crops, likewise preventing the too rapid ripening of grains, will serve to explain some of the benefits derived from the use of salt as manure; it will also explain why salt is so often beneficial on dry and quick soils, and in dry seasons, and why, on the other hand, so little benefit has been secured in using it on wet, tenacious and cold lands, like most of our boulder clays, or in very wet seasons.

This prolonging of the period of vegetative growth, and the stiffening influence on ripening straw by which lodging and consequent shrinking of the berry of the grain are prevented, are well recognized effects of salt as manure, and will serve in part to point out the conditions under which we may expect benefit from its use as manure.

Its solvent action on the insoluble mineral substances in the soil is also of importance in estimating the value of salt as manure.

AGRICULTURAL USES OF REFUSE SALT.

In discussing the influence of salt as a manure, we have mainly confined our attention to chloride of sodium, or pure sea salt. The salt that we find in the market, however, is never absolutely pure chloride of sodium, but always contains a small amount of foreign materials, such as sulphate of lime, chloride of calcium and of magnesium. If it contains even one part in a hundred of chloride of calcium or magnesium, sulphate of magnesia or soda, it would be considered unfit for table use because of its bitterness; or if it contains carbonate of lime or magnesia, it would be unfit for preserving meat. It is the aim of the salt boiler as far as possible to separate these foreign materials from his salt in the process of manufacturing, and he is put to considerable expense and trouble to do this, and the State requires that salt shall be inspected to see that this purification is carried to a reasonable extent. The result is that our commercial salt is a very pure article indeed, seldom containing more than one or two per cent of solids other than chloride of sodium.

We have seen that the agricultural chemist objects to salt as a manure because it is so pure—because it contains almost nothing but chloride of sodium—and he can hardly forgive it for being common salt at all. If it was anything else —sulphate of soda, of lime, or of magnesia, chloride of potassium or magnesium—anything but common salt, he could find something to say in its favor.

It makes no difference how many or how much of these foreign substances are contained in salt—the more the better. He would find good reasons why such a combination of salts would be valuable for manure because it contains so many substances "absolutely essential" to plant life, and all of them in a soluble and available form. In other words, the poorer the salt the better the manure. We thus see that the tedious and expensive processes in the manufacture of table salt for getting rid of these foreign materials is worse than thrown away in making a salt for manure; the long standing in the settling vats for oxide of iron to separate and subside, the removal of sulphate of lime during the boiling, the prolonged draining to get rid of chloride of calcium and magnesium, all these can be dispensed with, and the brine may be boiled down as soon as it is pumped, without any cleansing process, and yet furnish a better salt for manure than the best dairy salt. One-half of one per cent of oxide of iron would make the salt so rusty that we would reject it at once for table use, but it would not diminish its value as manure, and the salts of lime and magnesia enhance instead of destroying its value as manure.

We analyzed some refuse salt from Bay City to determine its value as manure. It is so rusty that no one would dream of using it on his table, and if it were used to salt beef or fish, the results would be disastrous, yet its value for manure may be seen from the results of analysis:

Common salt	87.74
Chloride of potassium	2.49
Sulphate of lime	1.68
Carbonates of lime and magnesia	.75
Oxide of iron	.87
Water	6.38
	99.91

Salt that contains 2½ per cent of chloride of potassium in place of the same amount of chloride of sodium, is worth $1.00 a ton more for manure than pure salt.

In the remarkable results that I have already quoted in your hearing, from the use of salt as manure in New York and in Canada, it was the refuse salt of the salt works that was used in nearly every instance.

I trust the salt boilers of Saginaw valley will turn their attention to manufacturing a cheap agricultural salt, by boiling down the brine directly from the pump, that the farmers of Michigan may have a chance to test its value as manure. The use of salt in this State has received but little attention, while plaster has come into almost universal use. Our climate, and much of our soil seem to be well adapted to the use of salt as manure. I hope to see a new departure both in the manufacture and use of salt in our State.

AGRICULTURAL COLLEGE, Feb. 16, 1880.

THE AGRICULTURAL CAPABILITY OF THE SAGINAW VALLEY.

BY HON. ISAAC MARSTON.

Such is the very comprehensive subject so thoughtfully furnished me for discussion by the gentlemen who so kindly invited me to be present and participate in the proceedings of this meeting. I presume I am expected to confine myself closely to the subject whether I know anything about matters properly pertaining thereto or not. Had the gentlemen gone farther and supplied me with the proper material, or better still, with a properly prepared article, I should have been better pleased, and my hearers would have been benefited thereby.

In one respect my friends were kind. The subject is sufficiently comprehensive to suit. I have not only the past and present to revel in, but I am to look into the future years, yea, centuries, I suppose, and from the dim shadows of coming events, give you all such accurate information, that in reliance thereon you may engage in business, purchase wild and unimproved lands, lay out villages and cities, buy and sell, and all with absolute certainty of success. Were ever mortals so favored before? Ah! kind friends, can I do all this? Remember, "'Tis the sunset of life that gives mystical lore," and I fear, notwithstanding the rapid progress that has been made in this valley during the past few years, that still more rapid must be made hereafter, or, ere my prophecies are fulfilled, you and I will have passed beyond, and, I trust, entered into possession of fairer lands.

My view of this subject will undoubtedly be far different from that which most of you, if called upon, would adopt. I can, however, but present my own ideas, many of them must necessarily be dry and uninteresting, and within the proper limits of this article I cannot argue each proposition in detail, I can but suggest food for thought, leaving you, each for himself, to follow and work out his own conclusions.

The subject seems to direct attention to that portion of our state drained by the Saginaw and its tributaries, or by enlarging the area, as one of your citizens in a previous article has done, including that portion drained by the rivers emptying into the Saginaw bay.

I have not, perhaps unwisely, adopted either of the above. I have thought that what most concerns us, are the facts and the circumstances with which we must deal from this time forward—as we are all most interested in those things most likely to contribute to our direct benefit. We take more interest in the affairs of our neighbors with whom we have, and are likely hereafter to remain in close business relations, than with those who although locally close yet are drawn in other directions.

At present and for years yet to come the tributaries of the Saginaw are and will be public highways for the transportation of the rough products of the forest. When that business ceases, as cease it must, they will no longer be of any practical benefit. As highways for the transportation of agricultural products they are not likely to be used. Our navigable waters upon which steam and sail can be used will have a controlling interest upon our agricultural affairs, but those not navigable will not, except as used for manufacturing purposes. As highways they will be of no commercial importance whatever.

Railroads not only assist in developing the resources of a country, but they bring within easy reach of each man's farm a market for his surplus products. They divert and change the natural channels of trade, and what without them might be tributary to some particular location is swept off in a different direction.

Another fact applicable in this direction. The surplus products of the farm in this part of the State will ever seek an eastern outlet. You may to-day build a railroad, from any point on the shores of Lake Huron, between the mouth of the Saginaw river and the straits, westward to Chicago; and while during the period of our extensive lumbering operations, it might by bringing in supplies and taking lumber westward, pay operating expenses. Lumbering, however, on an extensive scale at an end, and our country cleared up, such a road could not be operated. Such a road could have no continuous and reliable eastern connection at this end; it could not, therefore, carry through freight and passengers either eastward or westward; its business would be local with no inducements whatever to ship produce westward over it designed for the eastern market. In summer the lakes will afford an eastern outlet, but the season is short and much will remain to be done by the railroads in winter. This surplus agricultural products of northwestern Michigan, not carried by water, must go east to market by rail, and the railroads that carry it must cross the Saginaw river at some point between where we now stand and the mouth thereof. Some freight undoubtedly will go south of us for an eastern connection, but this will not be any more than will be brought in this direction from points far west of us. The counties, therefore, to the south and east of us, while properly a part of this valley, and while they have, and I trust will ever find it to their interest to continue their business relations, or a large portion thereof, with us, yet will not bring their agricultural products in this direction, while those west and north of us are and ever must be more and more closely identified with us.

I prefer, therefore, not to consider the Saginaw valley as that portion drained by the Saginaw and its tributaries, but rather that portion of the State drained by the present and future railroad system. My Saginaw valley, then, is bounded on the south by the southern boundary line of Saginaw and Gratiot counties; on the west by extending the western boundary of Gratiot county north to the Straits, and on the east by the waters of Lake Huron, Saginaw Bay, and the eastern boundary of Bay and Saginaw counties.

Here there is a territory of about 170 miles north and south by 70 east and west, containing over seven millions acres of agricultural lands.

Let me very briefly indeed, speak of the past, give a passing word to the present, and then looking forward, bring before you a picture of coming events, which many of those living to-day, if we are wise, will yet see in great part fulfilled. In doing this I may not confine myself strictly to the title of this article, believing it to be difficult, if indeed possible, to discuss agricultural development disconnected from manufacturing and other enterprises so essential to its success.

THE LAST

half a century has not passed since the white man first began to enter this territory. Then it was not to clear up and cultivate the soil, but to trade with the natives for the product of the trap and the gun. I need not remind you that for agricultural purposes the land was considered wet and unsuitable. Forty years ago the counties north of where we stand existed in name only.

Many of them were organized within the past twenty years, and some are not yet organized, but are attached to other counties for judicial purposes.

THE PRESENT.

Here is a territory abundantly watered by lakes, rivers, and springs, thus furnishing power in abundance for the farmer, and power for the manufacturer. The water of nearly all these lakes and rivers are clear as crystal, cold and pure, and all are abundantly stocked with fish. All kinds and varieties of forest and soil may be found. Tamarack and black ash swamps; low level lands upon which the soft maple, elm, and oak abound; lands rolling and hilly covered with beech, maple, hickory, oak, and other hard woods, and all these different kinds having a rich vegetable mold of from a few inches to several feet in depth resting upon a clay bottom. Then we have the higher, or rather lighter, warmer and sandy soils, where the pine and hemlock mixed with hard woods grow. All these different soils are capable of yielding, in the hands of intelligent farmers, crops most bountiful, and of every variety that flourish in the temperate zone. Owing to our proximity to the great lakes, surrounded as northern Michigan is by them, we are less liable to extremes of heat or cold than sections far south of us. We have no severe droughts in the summer, and from our abundant and frequent rainfalls and the great depth of our soils, our ordinary summer droughts affect us but little.

As a wheat producing region, either in quantity to the acre or quality, we stand pre-eminent. With ordinary cultivation forty, fifty, and sixty bushels to the acre have been raised, while with extra cultivation still larger yields are known. The quality of our winter white wheat when placed in competition with that of the state, has been awarded the first place. In corn, oats, barley, and other grains large and uniformly excellent crops have been raised. Much of this land is unexcelled for pasturage and hay, while in the production of roots and vegetables, no part of the State can successfully compete with us, as it has been demonstrated at successive State fairs. The fruits of northern Michigan are unexcelled. The apple, the pear, the peach, and the grape may all be grown here successfully; while in small fruits—the raspberry, the blackberry, the strawberry, and many others may be found in almost every field and fence corner. As conclusively showing the position occupied by Michigan as an agricultural state, the reports of the department of agriculture, published at Washington for the years 1871 to 1878 both inclusive, places the yearly cash value per acre of the principal products of the farm in this State ahead of Ohio, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, and Nebraska. Farming therefore is more profitable in this State than in either of those named, and the reports published by our Secretary of State show that the cereal products of this part of the State are better than in the older counties.

I shall not attempt to give the present agricultural development of the Saginaw valley. We are more interested in what the future shall be. I may but add until about two years ago, no wheat grown in the valley had ever been shipped out of it, indeed the supply fell far short of the local demand so that wheat had to be imported. The supply of other farm products do not yet equal the demand; large quantities of oats, of feed, of hay and fruits are annually brought here and find a market. During the past few years our agricultural growth has been most rapid, exceeding during the past three years any ten previous, and as we have now a large surplus of wheat for exportation so will we in a few years be able to supply all local demands for agricultural products and have a surplus for exportation.

THE FUTURE.

And now, what of the future? In what I may say under this head I must be understood as speaking of intelligent farming, which, while each farmer may not produce all his land is capable of producing, yet on the whole will give us a high average. While we have seen that the soil is rich and productive, that the whole region is watered by lakes, rivers and springs of the purest water, that farms may be cleared up and become profitable to their owners, yet to have all this we must have good farmers, and judging from the past and the present, I have no doubt but that this territory will continue to be settled, owned and possessed by intelligent, industrious people. Keeping this in mind, we must look to some of the older agricultural counties for the facts upon which our prophecies shall be based.

In the new counties the average size of farms is larger than the older, while some of the oldest also seem to be above the general average. This, to my mind, is easily accounted for. In the new counties land is cheap and large tracts are purchased. As the county becomes developed high prices are offered for lands, coupled with the belief that smaller farms are in the main more profitable, besides affording or being the means of affording other advantages, the size is reduced. In the oldest counties, as farmers become wealthy they purchase the smaller places of their neighbors, who desire to seek for pastures new, thus increasing the size of their farms and reducing the population.

In Berrien county farms average 75 acres, Calhoun 103, Eaton 77, Genesee 84, Kent 81, Lenawee 80, and Saginaw, I believe, not quite 79. If we take 80 acres as the average this would give us eight farms to the section, 288 to the township and 1,608 to the county. That eighty-eight families in a township, owning the lands they cultivate, is better than though the lands were owned by one or two individuals, even although the same number of men were employed to cultivate the soil, is apparent to all. Small farms when carried on by the owner are better cultivated, the highways are more in number and better, schools are built within the reach of all, churches are erected, besides other advantages, so that we have wealth, intelligence and christianity more generally and equally distributed with all the civilizing influences that follow in their paths, and certainly a more independent and more American class of people. God pity the poor man and his family who seek a home in a country where large tracts of land are owned by individuals for stock or farming purposes. May small farms ever be the rule in Michigan.

The population of an agricultural county is about thirty thousand. In the territory I have described there are seventeen counties, which would give us a population of 510,000. We have in the cities and villages on this river to-day a population of 60,000, which we may safely assume will be increased to 150,000 at least as the country is developed agriculturally. This would give us a total population of nearly seven hundred thousand. I think I might safely say that we will yet have one million residing upon this territory. I shall speak, however, of the smaller number.

It appears that the number of acres devoted to wheat in very many townships in this State run anywhere from 3,000 to 5,000 and upwards. Take an average of say 4,000 acres in each township to wheat, which would be about fourteen acres to each eighty-acre farm, and allow a yield of twenty-five bushels to the acre.—and I believe intelligent, progressive farming will yet insure this,—and we have 100,000 bushels as the product of such township. In the territory mentioned there are in round numbers 300 towns, thus giving us 30.000,000 bushels as the yearly product, or 6,000,000 bushels more than was produced in the entire State in the year 1877. Even with twenty bushels to the acre, the yearly wheat crop would be 24,000,000 bushels, which, at a dollar a bushel, would give a valuation of $24,000,000. In view of these figures, how insignificant our yearly salt product appears, although now considered, and justly, of so great value and benefit. Deduct from either of these quantities sufficient for seed and bread, and then some of you ready reckoners give us the number of car-loads that may yet pass through our cities, on its way to an eastern market.

The number of cows kept in one of our older counties, numbers about 2,000, the number of sheep from 50,000 to 100,000 and upwards, the number of swine 10,000, and a like number of horses.

The butter for sale from each cow should average 150 pounds; this would give us 600,000 pounds, $125,000 in each county, or a total in seventeen counties of $2,040,000.

The wool clip will average four pounds to the sheep; with 50,000 in each county, at twenty-five cents per pound we would have eight hundred and fifty thousand dollars. And ten thousand swine in a county should give one million pounds of pork to be marketed; this at five cents per pound would give us in the seventeen counties, eight hundred and fifty thousand dollars.

Notice I don't mention the sale of horses; those I leave to do the work. The oats, the hay, potatoes and other crops I have not included. I leave all such to be used on the farm, although in fact we know such would not be the case.

What then is the result?

A population of seven hundred thousand people.

A yearly product of thirty million bushels of wheat.

Twenty-five million bushels for sale at $1 per bushel	$25,000,000
Butter	2,000,000
Wool	850,000
Pork	850,000
	$28,700,000

Twenty-eight and a half million dollars each year! Why, it rivals your lumber and salt in their palmiest days!

Much of the picture, you will say, I have left out. What of the value of the farms, the character of the farm buildings, the highways, the schools, the churches, the villages, the manufactories, in fact all the evidences of civilization to be found in a rich agricultural country?

Yes, my friends, all these things will come with the rest. I can but ask you to turn your thoughts for a moment to one of our old settled agricultural counties and there behold at a glance what the future here will give us, and as the progress, intelligence and civilization of the nineteenth century exceeds that of the eighteenth, so will the twentieth that of the present.

In thus attempting to show you what we may reasonably expect, when you may ask, may we look for these things, and how shall they benefit us?

What I have said has been upon the assumption that the people of the cities on this river have a duty to perform which they will not neglect. You can very much aid the rapid agricultural development of this territory. If you will you can establish close business relations with the people thereof. You can bring them and their products largely to your doors. All this you cannot hope for by pursuing a course of indifference and inaction. The country is new; it is growing rapidly; if you will encourage and keep pace with this growth, the future for you is secure. Remember the channels of trade and commerce, when once opened and established, are hard to stem and more difficult to divert. You may create a channel in this direction over which the current of trade and business shall cease not to flow steadily and with increased volume. To do this you must know the people and their wants. You must sympathize with them and assist them and establish those sympathetic friendly business relations which increase and grow stronger each succeeding year.

But what are or are likely to be their wants? New highways that will help open up the country and bring the travel and traffic this way where it naturally belongs. Already a line of railroad runs up the central and western portions of this territory, which will soon be extended to the straits. Another is wanted to tap this and extend up and secure the shore trade. Encourage and assist this. What farther are they likely to want? Agricultural implements. Here is a want to be supplied that will increase year by year, and shall have no end. This river affords every facility for their manufacture, yet our plows, our drags and cultivators, our reapers and threshers, our wagons and carriages, all, yes, I may say all these are made outside the valley and shipped to meet the demand.

Villages have sprung up and will continue to do so. There will be a mercantile business, a demand for groceries, dry goods, hardware, and all the other articles usually found in a country store; because if your water and railroad facilities you should be able to successfully compete for, secure and retain this trade largely.

In this respect I am very well pleased with the progress that has been made —see that it does not lag.

Again, you must be prepared to purchase their wheat, their butter, their wool, and their pork, for where they sell they will be likely to purchase. Manufacture what you can of the wheat and the wool, convert their fresh pork into bacon, hams, etc., thus creating and building up new industries, giving employment to laborers and building up the population and wealth of your cities.

If you will think of and carry out these suggestions as you may deem right and proper, then I predict that when the lumber trade ceases, as cease it must, you will have established new branches of industry and have obtained a commercial business and importance far more valuable than anything you have yet had.

If you do not, if you permit the surplus products of the people to sail past you, or simply be carried across your rivers and through your cities, on its way to a market without stopping, then your wharves will become rotten and valueless, and silence will reign where now the sound of machinery is heard.

Fifty, yea one hundred millions in value of products may pass through your city every year on the iron rail and benefit your city scarcely a dollar. Residents in the cities on the Saginaw river, see to it that such be not your fate.

THE HOG.

BY MORSE W. JONES, OF RICHLAND.

The hog holds the same place among food animals that cotton has done among products of the soil. The pork product exported in 1878, amounted to $87,000,000, against $57,000,000 for all other animal products. Of the $87,000,000 (round numbers) $52,000,000 was for bacon and ham exports, and $30,000,000 for lard, so that $82,000,000 of the whole was for the manufactured article; thus giving a great impulse, not only to our farmers, but to the mammoth packing establishments and the cities, in the growth of which farmers are interested. At the commencement of 1879 there were 35,000,000 swine in the country, of an estimated price of $3.18 each. Had each of these 35,000,000 hogs been increased 50 pounds in weight by producers crossing them with some thoroughbred, the country would have reaped an immense profit. Even half that increase at four cents per pound would amount to $35,000,000. Only recently the people of this country attempted to found a great political party on the cry of saving only one-third of that amount by the issue of fiat money.

ORIGIN AND IMPROVEMENT OF HOGS.

Starting with the original wild hog of the forest, all domestic swine are descended from two families, *Sus scrofus* and *Sus indicus*, the swine of early England coming from the former, the wild boar of whose ferocity and strength we read with a shudder. The old England hog was big-eared, coarse-haired, head large, tusks strong, snout rough and angular, but it was a great improvement on the wild hog. From the *Sus indicus* family came the Chinese and Siamese breeds, from which our modern breeds have taken valuable qualities. Early English breeders made some progress by careful selections. The first improvement was in the introduction of the highly refined Chinese which were found too tender for profitable raising and abandoned as a pure breed, but crossed with the large coarse native stock. The Live Stock Journal says:

"The distinguising characteristic of the Chinese hog is the facility with which he converts everything into fat. From the time he is a week old until the day of his death, the Chinese pig or hog is fat. If kept in the same pen with others, and the feed be barely sufficient to sustain life in them, the Chinese pig is fat."

This is easily accounted for as the pig is well cared for, usually being fattened while a pig, for a roaster. Its shape has kept its type since our first knowledge of domestic animals; the body long and round; the back swaying in the center till the belly almost touches the ground; head, ear, and limb all fine; jowls heavy, face wide; neck short and high in the chin; color white, or, in the Siamese, black. The introduction of these pigs from China and Siam notes the beginning of valuable improvement in swine.

The improved Berkshire is among the earliest and best known of these Chinese-English breeds. The old Berkshire county hogs had maintained a high reputation for centuries. They were described as "long and crooked snouted, the muzzle turning upwards; the ears large, heavy, and pendulous; the body long and thick but not deep, the legs short, the bones large, and the size very great." "Hogs of the pure, original breed," says one writer, "have been known to attain an immense size. One bred at Petworth measured seven feet seven inches from the tip of his snout to the root of his tail: and seven feet ten inches in girth around the center, ten inches around the thinnest part of hind leg, and two feet across the widest part of back. He stood three feet nine inches in height, and, what is most remarkable, he did not consume more than two bushels and three pecks of ground oats, peas, and barley per week." It was, however, probably the best pig in England, and was wisely selected as the basis of those remarkable improvements, effected after the Chinese cross, which have rendered the modern Berkshire so celebrated. The Chinese blood was freely infused; after which we find the head finer, skin thinner, body thick and compact, legs short, sides broad, the head well set on, flesh firm and well flavored, color sandy, or spotted black and white. It was still the popular breed, judging from accounts published many years ago. This sandy color was quite common in the importations of an early day to this country. Later in Berkshire history the Neapolitan Essex cross, of which I shall speak hereafter, was used to give the finishing touches to the favorite breed. Then was eliminated the sandy color. For many years wise and judicious breeders have labored to fix the desirable qualities which had been combined in the Berkshire hog.

ESSEX.

The old Essex breed was described as up-eared, with long sharp heads, roach backed, carcass flat, long legged, white or spotted black and white, disposition unquiet. Lord Western, while traveling in Italy, saw some of the small black Neapolitan pigs, and came to the conclusion that they were just what he needed to improve his own coarse Essex. Writing to a friend he describes them as a breed in which the flavor of the meat was excellent, the disposition to fatten on the smallest quantity of food unrivaled. He procured a pair of thoroughbreds and took them to England. With these he eliminated the white from the old Essex. And in his hands and the hands of Fisher Hobbs, the Neapolitan cross was used as the basis of those improvements which have since resulted in the famous improved Essex.

As I have before stated, the Neapolitan cross was used to improve the improved Berkshire, and Harris says: The Berkshire breed have benefited much from the improved Essex cross, and the debt due Mr. Essex was afterwards discharged by Mr. Berkshire, and I find Harris quoting as follows: "The improved Berkshire was used to give size and constitution, many years ago to the Essex, and the most eminent breeder of Essex has informed me that on one occasion, in a litter of Essex pigs, *two little pictures* of the Berkshire, their ancestor by at least 28 years, appeared." But it was to the Neapolitan that the Essex were primarily indebted. The Neapolitan stands second only to the Chinese in the improvement of swine. "In themselves" says Mr. Youatt, writing in 1845, "they are not sufficiently hardy for general use, but crossed with rougher breeds, proved a valuable progeny." They were a small, fine boned, black breed, destitute of hair, which peculiarity we see occasionally cropping out in "hairless Berkshire and Essex of to-day."

The above shows how the improvement of our modern swine has been brought about. These improved English hogs were early introduced into the United States. The duke of Bedford sent some Bedfordshire pigs, as a present to Gen. Washington, nearly a hundred years ago, but they failed to reach their destination. Some of their descendants, however, found their way to New England and left their impress on the hogs of the whole country. In the early breeding of the Poland China, the descendants of the early Bedfordshire, distinguished by their peculiar colored bands, were a not uncommon feature in the hogs of the Ohio valley. Of course the English hogs found their way to our country during more or less of our early history, but the

INTRODUCTION OF MODERN ENGLISH BREEDS

into the United States did not receive very marked attention until between 1830 and 1840, when the great influx of Berkshires took place; since which time the importation of that breed has been quite constant to the present day. And to-day the Berkshire has a host of friends in this country, as well as in his native home.

The importation of Essex commenced soon after that of the Berkshire was fairly under way, and has since continued more or less constantly. The Suffolk appears to have found his way across the ocean, nearly at the same time with his neighbor the Berkshire. The small Yorkshire, which is claimed by some authorities to be identical with the Suffolk, are being urged on public notice.

AMERICAN BREEDS.

American experience has not developed a large number of breeds, but rather a great extension of the business of raising the best and largest number of specimens of the few breeds. Of the American breeds I shall refer only to the Chester White, Poland China and Jersey Red.

CHESTER WHITE.

This is the spoiled child of a rich parent. It was first brought into prominent notice before thoroughly established, and it became very popular. An enormous demand was made upon the breeders for the now popular animal. Owing to this, Chester county was thoroughly cleaned of all its white hogs. Chester Whites and half Chester White, and mongrel white, all at once, became Chester Whites, and were sent out all over the country. Great coarse-eared, slab-sided hogs were sent out of Chester county for pure Chester Whites, as unblushingly as were election certificates in Maine at a later day. The result, you all know. They soon became in great disfavor, and it has required the utmost efforts of later breeders to remove the stigma and again gain confidence for the Chester White. They never have become an established breed.

POLAND-CHINA.

But the farmers of the Miami Valley have given a hog whose career has not been as vacillating as the one just rehearsed.

Fifty years ago the rich bottom lands lying in the Ohio valley, were, if they are not now, the best corn lands in the country. Hogs and corn are of much the same significance.

Corn being the great crop of that section, the hog was their main reliance for a market. Cincinnati, the commercial center, was long known as Porkopolis.

The hog that would give the best returns for food consumed was long the goal of these pioneers. As may be expected, they were ever on the lookout for the animal that would be a profitable cross upon the already popular swine of their section. Animals were imported, crosses made, and careful selections attended to.

I have already spoken of the introduction of the Bedfordshire, one of the earliest of the Chinese-English crosses, how they were disseminated, etc. The Irish Grazier, a large, coarse, lop-eared, white hog of great size, was introduced. Those specimens imported later are described in an almanac published in 1842, as of fine length, splendid barrel, good legs and fair hams. These were used quite freely. Leicester and Byefield were also present and entered into the make-up of the favorite hog. From papers published in 1839–40 we find that the Berkshire was much used at that time in making up the stock of the country. This infusion of Berkshire blood has been questioned by a few parties, but periodicals published at that time speak of the infusion of Berkshire blood, which evidence I think to be conclusive; certainly much more to be relied upon than the fickle memory of any man. "In 1842," says Dr. Stetson, "the white Chinese and black Siamese hogs were introduced, and the hog of East India, crossed on all these various breeds, revolutionized the pork trade of the world." This wonderful little Asiatic hog, of which we have heard so much, was used until a considerable of the Chinese blood was infused. And about the same time that Lord Western died, about the same time that Fisher Hobbs was completing his great work in improving the Essex, about the same time that the Neapolitan-Essex blood was infused into Berkshire veins, the farmers of Butler and Warren counties came to the conclusion that they had the elements necessary for a good hog, and all that was now needed was to mould those elements. They now undertook to perfect the animal they had, to fix its qualities, to make permanent its peculiarities and certain its prepotency. Most of you are acquainted with the result and know with what success they have met. The make-up of the Poland-China can be resolved into two classes of elements: one, the coarse rough animal of the original type, the other, the refined Asiatic.

JERSEY RED HOGS.

For some time we have noticed the gradual brightening of another body in the pork firmament. I speak of the Jersey reds. From the N. L. S. Journal, Feb., 1877, I copy: "The hogs known as Jersey reds originated in New Jersey where they have been bred, it is stated, for over 50 years. It is probable that they are descendants from the very early importations of Berkshires, among whom sandy spots were quite common. They are black and sandy or red, have coarse and thick hair, heavy bone, strong constitutions, and great capacity for growth." They appear to be the old Berkshire retained pure.

RELATIVE MERITS OF THE BREEDS.

Now for me to attempt to decide which of the standard breeds is the best, would be a difficult thing to do. For when my verdict was given, you would answer, "he looks with a predisposition in favor of the Poland-Chinas," and such, I think, would be the case, for no man, however candid, can deny that his own hog, or that his own house, or that his own wife's baby is estimated to be a little finer than some one's else. Every breed of hogs, however, has its own peculiarities, and distinctive qualities. The real question is: which of these combinations of qualities will give the best returns, under our circumstances? To be as just as possible, I will allow the friends of the different breeds, respectively, to speak for their favorites; each one of the breeds to be judged at the bar of its own friends. Hon. E. W. Cottrell, long connected with the well known breeding establishment of Wm. Smith, says of the

BERKSHIRE:

"They are not ravenous like the common hog, but are good feeders, and what they eat does them good all over; and in fact they may be briefly summed up as a hardy, prolific, domestic and reasonably easy keeping animal. and one that can be sent to market at almost any age, with profit to the producer and satisfaction to the consumer." Thus you see the Berkshire has a combination of many valuable points. The same writer says of the

SUFFOLK:

"They are the earliest to mature, take on fat more readily, and give better returns from the same food than any other of the hog kind; they are docile and domestic and have a good constitution, and are invariably healthy with us, when past the tender age." They are apparently a favorite with Mr. Cottrell.

ESSEX.

The same breeder says: "The Essex are so similar to the Suffolk in nearly every respect except color that the above description of qualities may be applied to them. Their skin, from its color, affords them one advantage over the Suffolks, that is, when the pigs of the latter are very young, if exposed to a burning sun, they are very liable to scald or blister upon the back, while this is never the case with the Essex." "Here let me say," he continues, "that when Suffolk pigs are farrowed during the summer they should be protected from its scalding rays until five or six weeks of age." From this statement at the hands of one who has long raised these hogs and liked them, we can see they are possessed of valuable points, and the fact that while they (the Suffolk) long have been a pet with the breeders they have never become a favorite with the majority of the farmers and swine raisers may be attributed in part I think to this early tenderness, and the same may be said, though in a different light, of the Essex. But, gentlemen of this institute, we have in this country a breed of hogs originated in this country, for this country brought out by the exigencies of the case; originated for our great American corn crops and our great broad farms; that is a favorite with the farmer as well as with the breeder. He is a genuine American and quails not when in the presence of the bluest blood that ever ran in porcine veins. For many years the Americans could not, and did not, make a move but that the votaries of blue blood across the waters drew aside their royal garments while they muttered, "mongrel," or "low," or "common," or "cheap." But I notice that American goods found their way to English backs if they were cheap; that American implements were used not only by American farmers, but by English farmers also; aye, in fact they have found their way to every nation of Europe. I find to-day, members of this Institute, English M. P. traveling over this country of "common" people. That they may see its poverty? its cheapness? Far from it; but that they, seeing, may learn the secret of our success and profit thereby. They found that the American was quick to take results in hand and judge for himself; quick to discern which of several ways or things is the most profitable.

The sneer to which the Poland-China was formerly treated has changed, for this American hog has proven capable of taking care of himself and is found by the farmers of Ohio, Indiana, Iowa and Illinois to be the most profitable. Nine-tenths of the product of these great pork producing states is Poland-China, a fact not surprising when we consider this breed's peculiarities. While possessing the good feeding qualities of the English breeds, docility and early maturity, it is large and fine, strong in bone, and more quiet and of better disposition than the Berkshire—quite an item in the corn-crib account. It is more hardy, requiring less persistent care than the more delicate little Suffolk and Essex, and when fattened none excelled its admirable shipping qualities, which make it a favorite with the packer.

The question of breeds aside, no individual hog can be most profitable unless it has (1) a strong constitution, (2) well developed digestive powers, (3) strength of bone. If we have such stock we want to keep it; if we haven't, we want to produce it right away. It is well known that radical changes in the general appearance of animals of any breed may be made in a few years, by making selection with reference to some definite purpose. This method was formerly in much more common use than now in this country, with Berkshires; the liking of one man or county of men leading them to select for size. The Poland China having been originated in this country, all the animals of whatever fancy in breeding are to be found, hence different parts of the country have developed differences in color, size, etc., more marked than we would expect from animals of a single imported stock. The leading breeders are united in regard to the points of the Poland China, but the inferior specimens are as earnestly advocated by their owners as in case of the genuine Poland China. This circumstance, which is no objection against the breed, has created a necesity for a record or pedigree book, so that any one may know just how and in what lines and families the different stocks have been bred. Mr. L. N. Bonham, of Ohio, is secretary of one record published in Ohio, the second volume of which, now in press, contains the best Poland China history ever printed. "The American Poland China Record" is published at Cedar Rapids, Iowa. The Berkshire breeders have a record of which three volumes are already out; Phil. M. Springer, of Springfield, Ill., is their Secretary. The small Yorkshire breeders have been moving in reference to a record.

THE CARE AND FEED OF STOCK.

What I say here will be in the line of caution, and my first caution is this: corn, our great pork feed, is mainly a fat forming food, and hence should not be fed exclusively; in particular it should not be the sole feed of pigs in which you are trying to secure growth. If fed to pigs it should be steamed or soaked for 24 hours. A very popular food with us for young stock is mill feed. It contains more of the elements necessary for the building up of bone and muscle than does corn. It is well known that the only food that combines all the elements necessary for healthy growth in the young is milk. With this in mind, we have found a fair substitute for milk by scalding equal parts, by measure, of mill feed and a mixture of ground corn and oats, equal parts also. It is a good, healthy food. Messrs. Laws and Gilbert, of England, who have made the most famous and careful experiments in feeeding pigs on record, said, when speaking of one of their experiments: "It was obvious that the Indian corn meal, alone, was in some way a defective diet; and it occurred to us that it was comparatively poor, both in nitrogen and in mineral matter, though we were inclined to suspect that it was a deficiency in the latter. We were, at any rate, unwilling so far to disturb the plan of the experiment as to increase the supply of the nitrogenous constituents in the food, and accordingly determined to continue the food, but at least to try the effect of putting within reach of the pigs a trough of some mineral substance, of which they could take if they were disposed. The mixture which was prepared was as follows: 20 lbs. finely sifted coal ashes; 4 lbs. common salt; 1 lb. superphosphate lime. A trough containing this mixture was put into the pen at the commencement of the second fortnight, and the pigs soon began to lick it with evident relish. From this time the swellings or tumors, as well as the difficulty in breathing, which probably arose from pressure of the former, began to diminish rapidly. Indeed, at the end of the second fortnight the swellings were very much reduced, and at the end of the third they had disappeared entirely." Another caution: The care of the dam when raising her young. Few people have any idea, I venture to say, of the great drain that is made upon the dam at this time. Let us take an example. I weighed a litter of eight pigs at birth; they weighed 19 lbs., a little short of 2½ lbs. per pig; at the end of the first week they weighed 45 lbs., a gain of 3 lbs per pig; at the end of the second week they weighed 68 lbs.; at the end of the fourth week they weighed 120 lbs. In the four weeks the pigs had gained 100 lbs., all of which had to be drawn from the dam. Now it is evident that at that time she should have the best of care, else she becomes emaciated; and yet some of our swine raisers often wonder why they have such poor luck with their young pigs. Twenty-five lbs. per week from one animal cannot be taken, except to the detriment of that animal, when it plows an acre of ground for its food and quenches its thirst at some mud-hole.

But let me say here that during the first six to ten days the animal should be very lightly fed, giving the pigs a chance of becoming capable of using it before a larger flow of milk sets in, otherwise bad results are apt to follow—inflammation, etc.

In the light of what has just been said, I think that nothing need be said about the deplorable practice of breeding from young, immature stock. It is plainly to be seen that the result must be a loss in constitution and size of the animals of the herd. It also, when followed, fits a herd to be easily victims to the first epidemic that visits the neighborhood. While the care of the female is thus found to be an important thing in profitable swine raising, the selection of the male I think is fully as important, for on him depends the qualities of the whole future herd—size, growth, constitution and good feeding qualities in a great measure. On this one subject I would like to speak at length; of the influence of one male on the health, the make up and the profit of the herd.

DISEASES OF THE HOG.

That such an animal as the hog should ever become diseased strikes us at once as peculiar. For the hog is endowed by nature with a splendid physical constitution, rugged and hardy, strong lungs, powerful stomach and digestive organs by which to convert his food into fat; strong heads and strong jaws, and strong teeth to aid them in procuring their food. There is nothing in their physical organization by which we can look for an explanation of the prevalence of disease among swine. Yet it is stated that Iowa alone suffers an annual loss of $2,000,000 by disease of swine; and I understand that a few of the hospitable farmers of Climax had less live hogs to take to market than they wished they had. When disease manifests itself in human beings, means are taken at once to find the cause, and if possible remove it. No pains are spared to find out what natural laws of health have been violated; for nature, in her economy, has done all things well; she has established laws of health for both man and beast; to follow them insures health, while a violation thereof just as reasonably insures disease. "But anything is good enough for a hog." Man builds for himself a roomy mansion, for his horse and cow a good warm stable, for his sheep a clean, warm place, and says, "Mr. Hog, you get into that filthy den, eat and grow fat." By and by sickness reaches his neighborhood, his hogs die as if they were disgusted with this earth, as doubtless they are. "I've got the cholera," he says; and then he wonders again why it is that hogs die, the strong and hardy hog, while his sheep go in and out and grow fat. The sheep is furnished the purest of water, the hog may drink from its own cess-pool. Why, I admire the pluck of the animal that dies to spite a man that uses it thus!

But of even more importance than the food we eat is the air we breathe; and yet I have seen hogs crowded together under a low roof or barn, or in a filthy pen where the poison odors were rising so thick that it would give a man a chronic inflammation of the stomach to be there long enough to feed, and have seen those hogs drawn out, one by one, dead. The owner said "cholera," and no doubt wonders why the kind Father sent such pestilential scourges on the goods of his children.

The necessity for having pure air may be readily understood. The blood, loaded with the waste of the system, broken down tissue, etc., from all parts of the body, is conveyed to the lungs to be purified and made ready for further use in the system. This purification when in contact with the air in the lungs consists in giving off the poisonous waste to the air and taking up of pure oxygen from the air. Thus in breathing we deprive air of its oxygen and give in its place carbonic acid. The longer we breathe the air of a confined space, the more loaded with the latter it becomes, the less of the former it has. A definite amount of oxygen is needed by the blood from each inspiration. Hence this impure air is bad in a double sense: First, it does not supply the blood with the means for doing its work of regeneration in the system; Second, in its place it does supply the blood with the poisonous exhalation thrown off until it becomes gorged. Then this dark, swollen mass of corruption begins its journey and goes through the system just as if it were pure and health-giving blood. The brain receives its portion of the poison, the stomach its portion, the muscles their portion—not one part of the body but that becomes just fitted for the reception of any floating germs of a contagious scourge; aye, for the generation of almost any malignant disease. Now, if this be the truth, we would not expect that scourges would necessarily be confined to the hog. And is this the case? Whenever man violates those immutable laws of health, he has to suffer. If the man allows his air or drink or food to become polluted he has to suffer for it. Need I mention stricken Memphis and Holly Springs and New Orleans? Some of us know what it is to have a Memphis in our swine yard.

The essayist enforced the lesson of proper sanitary surroundings for swine from the history of cholera. In the New Orleans epidemic of 1853 the district which suffered more than double any other portion of the city had "a series of low, crowded, and filthy pest houses, inhabited by the lowest class of people. The proportion of death here was 542 to 1,000." They lived "like hogs" and died like hogs. In the visitation of the fever to British Guiana in 1852–3 its deadliest effects were in the "damp, low, crowded places, and the neighborhood of putrid exhalations." Jameson's description of cholera in the Marquis of Hastings' camp on the banks of the Scinde in India, in 1846, says: "Here 9,000 were carried off in the course of a single week, the disease rapidly subsiding on the withdrawal of the troops from the locality." Another report on the cholera in India in 1849 says: "The disease commits its greatest ravages in crowded, ill-ventilated barracks, bazaars, and densely populated towns, particularly such as are surrounded by walls, preventing ingress of pure air, and on that proportion of them where noxious gases are evolved by the decomposition of animal and vegetable remains." After referring to the obduracy of people in taking warning from their terrible experiences, the essayist continues:

Our superior climate and cleanliness in Michigan has exempted us in the main from such wide spread scourges. Yet even we might be surprised if we knew how many an individual friend of ours had come to an untimely grave from just such causes.

While our swine, also, have been largely exempt from the prevailing scourges which have desolated the swine yards of other sections of the country, yet in many cases the limit has been reached, the boundary line of health over stepped, and disease invited. The more animals we keep the more care is required that the rank organic matter does not accumulate in excess, for when once it gets among us it is no respecter of persons. Hog cholera is practically unknown and never originates where there are not large numbers of animals, or so many that they cannot be properly cared for. Again, a man taking the craving of his system as a guide, does he confine himself to a diet of one unchangeable food? I trust not. Yet many a hog sees naught but corn from the setting in of winter until the opening of spring. Is it reasonable that the hog because he is a hog needs no change of food of any kind? I think not. One little thing in particular may save you many an animal's life; just humanely give your pigs some salt in his food every day and don't be afraid of giving it too much. Physiologists tell us that salt gives animation to the fluids of the body, enabling them to pass through the animal membranes of the body with much greater alacrity—increases the osmotic action, they say. It greatly aids digestion. We recognize the need of salt; we salt our potatoes, we salt our meat, we salt our bread, we salt our puddings, and I presume the thrifty housewife can tell us of some other foods that are salted. Then why don't we salt our pigs? It is not going outside of nature. The wild animal has its salt-licks. And a hunter can tell you that a deer-lick is well patronized, in spite of the danger. Use it freely. If you are troubled with rooting hogs place within their reach a mixture of ashes, coal, and salt.

Now, to sum up, doctoring hogs is poor business; the most that can be done is to keep them from getting sick; they are loth to be handled as a rule. In this case, in an important sense, "an ounce of prevention is worth a pound of cure." In winter keep your animals in good warm quarters, and do not allow filth to accumulate around the pens. Now and then give a change of food, if no more often than once a week, that will often suffice. We have found a feed of roots to be so valuable in keeping our stock healthy in winter, that we never fail to raise a small patch. Mangel wurzel beet is about as paying a root crop as any to raise, and is well liked by the stock. Animals wintered thus, also have much better results with their young in the spring. Again I repeat it, not corn alone to stock animals. The pens should be occasionally purified by a sprinkling of chloride of lime, frequency determined by the odor of the pens. When cholera is in the neighborhood, I would never allow a week to pass without sprinkling the pens with a solution of carbolic acid, which purifies the air and tends to destroy any germs of disease that the treacherous wind has brought, uninvited, to visit death upon your herd. At such time the piggery should have an odor of carbolic acid at all times. In fact a solution of carbolic acid in water is used as a remedy for cholera. Numberless receipts, claimed to be "sure cure for cholera," are published, and more are advertised, but I would advise no one to introduce the disease into his herd with the expectation of finding he has a sure cure in any one or all of them.

The outlook for the swine raiser is good. European nations which long have had a dislike to swine flesh because their own swine were so contemptible, are becoming alive to the excellency, the economy of American pork. They are losing their prejudice, and in them we think we see a growing customer, that will be reaching out for our surplus pork for many years to come. I think it prudent then that we go on improving our stock, and we shall find that just so fast as we get free from the idea that "anything is good enough for a hog," just so fast are we going to make the raising of swine a more pleasant as well as paying business.

MICHIGAN STATE AGRICULTURAL SOCIETY.

PROCEEDINGS AND REPORTS FOR THE YEAR 1879.

Detroit, June, 1880.

R. G. BAIRD, Esq., *Secretary State Board Agriculture, Lansing:*

I herewith transmit to you proceedings of the Executive Committee of the Michigan State Agricultural Society, with the reports of its transactions for the year 1879.

Very respectfully yours,
R. F. JOHNSTONE.

OFFICERS OF THE MICHIGAN STATE AGRICULTURAL SOCIETY FOR THE YEAR 1879.

President—GEORGE W. PHILLIPS, Romeo.
Secretary—R. F. JOHNSTONE, Detroit.
Treasurer—A. J. DEAN, Adrian.

EXECUTIVE COMMITTEE.

Terms Expire December 31, 1880.

JOSEPH M. STERLING, Monroe, Monroe Co.
WM. BALL, Hamburgh, Livingston Co.
HENRY FRALICK, Grand Rapids, Kent Co.
A. O. HYDE, Marshall, Calhoun Co.
W. H. COBB, Kalamazoo, Kalamazoo Co.
E. W. RISING, Davison Station, Genesee Co.
PHILO PARSONS, Detroit, Wayne Co.
I. H. BUTTERFIELD, Jr., Port Huron, St. Clair Co.
C. W. GREENE, Pontiac, Oakland Co.
WM. CHAMBERLAIN, Three Oaks, Berrien Co.

Terms Expire December 31, 1881.

ABEL ANGEL, Bradley, Allegan Co.
D. W. HOWARD, Pentwater, Oceana Co.
H. O. HANFORD, Plymouth, Wayne Co.
F. M. MANNING, Albion, Calhoun Co.
A. F. WOOD, Mason, Ingham Co.
F. V. SMITH, Coldwater, Branch Co.
J. Q. A. BURRINGTON, Vassar, Tuscola Co.
JOHN McKAY, Cheboygan, Cheboygan Co.
JOHN GILBERT, Ypsilanti, Washtenaw Co.
C. A. HARRISON, Paw Paw, Van Buren Co.

EX-PRESIDENTS—HONORARY MEMBERS OF COMMITTEE.

C. G. MONRO, Jonesville, Hillsdale County.
M. SHOEMAKER, Jackson, Jackson County.
JAMES BAILEY, Birmingham, Oakland County.
H. G. WELLS, Kalamazoo, Kalamazoo County.
W. G. BECKWITH, Cassopolis, Cass County.
W. J. BAXTER, Jonesville, Hillsdale County.
GEO. W. GRIGGS, Grand Rapids, Kent County.
CHARLES KIPP, St. Johns, Clinton County.
E. O. HUMPHREY, Kalamazoo, Kalamazoo County.
W. L. WEBBER, East Saginaw, Saginaw County.

STANDING COMMITTEES.

Business and Transaction Committee—J. M. STERLING, Monroe, Chairman; W. L. WEBBER, East Saginaw; W. J. BAXTER, Jonesville.

Committee on Finance—H. FRALICK, Grand Rapids; JOHN GILBERT, Ypsilanti; E. W. RISING, Davison Station.

Committee on Premiums—A. F. WOOD, Mason; D. W. HOWARD, Pentwater; J. Q. A. BURRINGTON, Vassar; C. KIPP, St. Johns; H. O. HANFORD, Plymouth; I. H. BUTTERFIELD, Jr., Port Huron.

Committee on Rules—WM. BALL, Hamburgh; A. O. HYDE, Marshall; C. A. HARRISON, Paw Paw.

Committee on Printing—E. O. HUMPHREY, Kalamazoo; A. J. DEAN, Adrian; A. O. HYDE, Marshall.

Committee on Receptions—PHILO PARSONS, Detroit; M. SHOEMAKER, Jackson; C. W. GREENE, Pontiac.

Committee on Programme—A. O. HYDE, Marshall; W. H. COBB, Kalamazoo; D. W. HOWARD, Pentwater.

Police—J. M. STERLING, Monroe; H. FRALICK, Grand Rapids.

Gates—H. FRALICK, Grand Rapids; J. GILBERT, Ypsilanti; E. W. RISING, Davison Station.

General Superintendent—W. G. BECKWITH, Cassopolis.

Chief Marshal—A. O. HYDE, Marshall.

EXECUTIVE SUPERINTENDENTS.

Cattle—D. W. Howard, I. H. Butterfield, Jr.
Horses—W. H. Cobb.
Sheep—J. Q. A. Burrington.
Swine—A. F. Wood.
Poultry—John McKay.
Miscellaneous—E. O. Humphrey.
Fine Arts—W. J. Baxter, C. A. Harrison.
Music—John Gilbert.
Children's Department—Mrs. General A. S. Williams and Miss Minnie Brow.
Manufactures—F. V. Smith.
Agriculture—Philo Parsons.
Machinery—F. M. Manning.
Farm Implements—H. O. Hanford, Abel Angel.
Dairy—Chas. Kipp.
Vehicles—Wm. Ball.
Forage—E. W. Rising.
General Superintendent—W. G. Beckwith.
Chief Marshal—A. O. Hyde.
Police—J. M. Sterling, Henry Fralick.
Gates and Gate Keepers—The Finance Com.

PROCEEDINGS OF THE EXECUTIVE COMMITTEE OF THE MICHIGAN STATE AGRICULTURAL SOCIETY.

FIRST DAY.

Michigan Exchange,
Detroit, January 12, 1880.

The regular annual meeting of the Executive Committee of the State Agricultural Society opened in the parlors of the Michigan Exchange, in the city of Detroit, this evening, the President, the Hon. William L. Webber, in the chair.

The roll was called by the Secretary; the following members answered to their names:

President Webber, Treasurer Dean, Secretary Johnstone, Messrs. Angel, Burrington, Childs, Dewey, Hanford, Manning, Smith, Wood, Ball, Cobb, Fralick, Hyde, Parsons, Phillips, Rising, Sterling; Ex-Presidents, Messrs. Shoemaker, Baxter, Griggs, Kipp—23.

Geo. W. Phillips tendered his resignation as a member of the Executive Committee, he having been elected President of the Society.

On motion of Mr. Baxter, the resignation of Mr. Phillips was accepted, and, on motion of Mr. Wood, I. H. Butterfield, of Port Huron, was elected to fill the vacancy.

President Webber then read his address as follows:

ADDRESS OF PRESIDENT WM. L. WEBBER.

Gentlemen of the Executive Committee.—Retiring at this time from the duties of President of this Society, I desire to submit such remarks and recommendations as I believe will be for the benefit of the Society.

I congratulate you that, notwithstanding the unfavorable weather during our last State Fair, the interest felt in its objects was such as to produce an income in excess of the expenditure. The report of the Treasurer will give you exact figures. The amount in the hands of the Treasurer now is some two or three thousand dollars in excess of the amount in his hands a year ago. The balance in his hands January 14, 1879, was $19,027.91. This is a greater sum than is necessary for the Society to have on hand. I recommend that you authorize and instruct the Treasurer to put at least $15,000 of the amount on hand at interest by investment in registered government bonds.

At the last session of the Legislature an act was passed, as requested by this Society, authorizing it to hold property to an amount not exceeding one hundred thousand dollars; also providing that the Society should not be liable for loss by fire or otherwise of animals or articles on exhibition at its fairs. The act also provides that the Secretary and Treasurer of the Society shall each give bonds in such amount and with such sureties respectively as shall from time to time be required by the Executive Committee, conditioned for the faithful performance of their duties; and to account for and pay over, as the Executive Committee shall order, all such moneys as shall come into the hands of such officers respectively by virtue of their office. It will be necessary for you at this meeting to fix the amount for such bonds, and in case the same shall be presented at your present session, to decide upon the responsibility of the sureties. The act further provides that in case either of said officers shall neglect or refuse to give such bonds within such time and with such sureties as should be approved, it should be competent for the Executive Committee to declare the office vacant and fill it by appointment until the next election. This gives you full power in regard to this subject.

At your last winter's meeting you directed the employment of clerks for superintendents, and authorized blanks upon which the premiums awarded should be reported. Owing to some misunderstanding by the clerks of their duties these blanks were not properly filled out during the Fair, and as a result, several weeks elapsed after the Fair before it was authoritively settled what awards had been made. The clerical force was sufficient, had their duties been properly apprehended, to have had those lists complete before the Fair week ended. Prompt payment of premiums I think due to exhibitors, and I recommend that the system be continued, and that especial pains be taken to see that it be made effectual at the next Fair.

By far the greater portion of our halls is used by exhibitors who bring their goods merely for advertising purposes. The cost to the Society for furnishing this space is greater than the amount of ordinary premiums, and I advise that hereafter no premiums be offered for such goods and articles as are usually exhibited for advertising. If we provide the opportunity, the exhibit will be as large without as with premiums.

Heretofore there has been a discrimination in premiums offered for the different breeds of cattle; larger premiums being offered for Short-horns than any others. I recommend that the practice of the Society in that respect be changed, and that all deemed worthy of encouragement be put upon an equality. It has been said that because the larger proportion of the cattle of improved breeds in the State were Short-horns, therefore it was just that a larger proportion of the premiums should be awaded them. I do not think this argument sound. The greatest agricultural production of the State in value is wheat, and yet it has not been deemed necessary for that reason to offer the largest premium for its encouragement. The value of Short-horns is well understood throughout the State. We have breeders who claim that the Hereford is a more valuable animal for the Michigan farmer. They are dissatified with the preference given to Short-horns, and I think justly so. If all are put upon an equality none will have reason to complain, and each breed can then stand upon its merits. I also recommend that competition be open to the world.

The Pomological Society has exhibited with us for several years, and I understand a committee has been appointed to meet with you at this session with reference to an arrangement for a continuance of this practice. The moneys which we have on hand and which we may receive are moneys paid by the public, and we are merely its trustees to see that they are expended in furtherance of the objects of the Society. I recommend that the Pomological Society be invited to continue its co-operation with us, and that this meeting make such appropriation in their favor as in your judgment will be proper.

Our farmers have realized and are still realizing good prices for their products. This comes largely from the foreign demand for breadstuffs and meats. Our production of both is in excess of our own requirements, and the value of that produce is, and will be, measured by the price paid for our surplus. This being so, the farmers of this State may well congraulate themselves upon the fact that we have again reached a standard of values which is recognized by the commercial world.

The object of this Society being to encourage development, I recommend that special premiums be offered for agricultural productions from Northern Michigan, so-called, and also special premiums for productions from the Upper Peninsula, these being the portions of the State least developed agriculturally and needing most encouragement. This is a matter of special public interest, from the fact that the State holds such a large quantity of lands unsold in trust for various purposes, and in my judgment the offer of those premiums will have a tendency to bring the agricultural value of these comparatively unknown regions to public notice, and to stimulate development.

I recommend also that the Dairy Department be continued. This interest may be greatly developed in this State with profit. Wisconsin is far ahead of us in that respect, but our situation is such that Michigan should take front rank in this industry.

During the Fair great embarrasment is experienced by superintendents in procuring judges to make awards. I recommend, to obviate this so far as possible, that each superintendent be instructed to appoint judges in his department some time previous to the Fair, and to procure from the judges thus appointed a promise that they will attend and perform their duties, the Society undertaking to pay their expenses. As the members of the Executive Committee freely give their time, I have no doubt, on proper application, gentlemen and ladies fully competent for the faithful performance of those duties, will not only undertake to act, but will come to the Fair as the members of the Executive Committee come, feeling an obligation to perform the duties thus assumed in the public interest. By making these appointments in advance, the judges will have opportunity to fully advise themselves concerning their duties, will be prepared to act promptly as soon as the exhibition is fairly opened, and their reports can be made and signed by them and approved by the superintendents, and thus save great labor in the Secretary's office, heretofore made necessary by imperfect reports, and also enable exhibitors to know at once what awards have been made in their favor, and to receive payment thereof promptly.

I tender to you, gentlemen, my thanks for the zeal and promptness with which you have, without hope of reward other than the approbation of your fellow-citizens, performed your arduous duties. I wish particularly to mention the renewed obligations we should all feel to the Chairman of the Business Committee, Hon. J. M. Sterling, for the great labor performed by him in preparing for the Fair. None except those who have been intimately acquainted with the workings of the Society can appreciate the responsibilities of his position, nor the value to the Society and to the success of the Fair, of his great experience and indefatigable labors.

I trust that your session will be pleasant and harmoniour, and have no doubt that each and all will be actuated by a desire to serve the public interest by promoting in every pay possible the objects for which the Society was incorporated, to wit: "The promotion of the improvement of agriculture and the kindred arts."

After President Phillips took the chair, Philo Parsons requested the privilege of offering the following preamble and resolutions, which were unanimously passed:

Whereas, The Hon. W. L. Webber has, during the past year, presided over our meetings and deliberations, at very considerable sacrifice of time, with dignity, fidelity and impartiality; lending by his influence and effort, tone and character to the great organization we represent, as also to the general interests of agriculture; presenting papers at various times distinguished for thought and practical utility, elevating and progressive in their tendency over an energetic, growing State; therefore,

Resolved, That recognizing the great value of his services to us, we part with him as our presiding officer with extreme reluctance, tendering to him our warmest thanks for the interest he has ever manifested in our prosperity, with an assurance that we shall ever cherish for him personally sentiments of no ordinary regard.

Resolved further, That we have great pleasure in congratulating ourselves and our constituents, that though Mr. Webber retires from the position of presiding officer, he yet remains permanently connected with the Executive Committee, and we are, therefore, sure of the benefit of his matured wisdom and thought, and active personal co-operation in all that concerns the great material interests which we are unitedly seeking to develop and promote.

Mr. Webber briefly returned his thanks for the compliment.

He then introduced the President elect, Hon. Geo. W. Phillips, who addressed the committee as follows:

INAUGURAL OF PRESIDENT GEORGE W. PHILLIPS.

Gentlemen of the Executive Committee:

The task which devolves upon me to-night is one which I very much wish had fallen to the lot of some one more competent for it than I am. Still, as the members of this Society, by electing me its President, have laid this duty upon me, I most willingly discharge it as best I can. Before proceeding with the suggestions which I desire to make in connection with the Society's operations, permit me a word of congratulation with regard to the great prosperity which has blessed all the industries which we as a society represent and aim to foster and encourage. During the year just closed Providence has smiled upon the labors of the husbandman, rewarding his toil with an abundant harvest, and the general revival of trade and commerce seen and felt everywhere secures him a ready sale and good prices for all his surplus products.

My acquaintance with our State Agricultural Society dates back as far as the year of its organization, 1849. It then offered $1,000 in premiums. This is less than one-tenth the amount actually disbursed on account of premium checks in 1878, exclusive of the Horticultural Society, according to the last published report of the Treasurer. For this wonderful growth, which now makes our Society one of the best in the country, the State is indebted to the persevering industry and untiring energy of the Executive Board. The practical wisdom, integrity and earnestness of purpose of the gentlemen to whom the management of the Society is now committed has led me to accept with a measure of confidence the position of President, believing that we shall work harmoniously together for the best interests of the Society.

I have a few recommendations, which are here submitted, as follows:

GENERAL POLICY.

Our policy should be of a broad and liberal character. I know this is the State Agricultural Society of Michigan, and that to foster all the industries of the State, especially those relating to agriculture, is our first duty and the principal object of our existence as a Society. Still I regard it as perfectly in harmony with this end, and in a measure promotive of it, to invite the competition of all who are willing to compete.

Michigan can compete with any State or Province on the continent, and come off first or second best every time. I would recommend, therefore, that our premium list be open to the world, and that we extend a hearty welcome to all to join us. It will greatly enhance the interest of the fair and best secure its end as an educator of the people to have the very best specimens anywhere produced among the different classes of our exhibitors.

CATTLE.

At present the premium list gives a preference to Short-horns over other breeds of cattle. It may perhaps be claimed as a reason for this that the Short-horns are more numerous than any other breed in the State. This does not, however, appear to me to be a sufficient reason for the preference referred to. In the early days of the Society the Devons were much more numerous than the Short-horns; probably two of the former to one of the latter were exhibited at our fairs. Yet there was no complaint from the owners of Devons that the same amount of money was offered in premiums in each class. Give the same rates of increase for the next eight or ten years that we have had for the past three or four years, and the Jerseys will far outnumber any other breed of blooded cattle in the State. Then is it not best to stimulate and foster most that in which we are weakest, and not that in which we are strongest? I would therefore recommend that the same amount of money be expended in premiums for each class. Let us henceforth place all these classes on an equal footing. The dairying interest of the State will have a just reason of complaint unless this policy is adopted.

HORSES.

As regards horses, our premiums are liberal. This is as it should be, as it is our duty to encourage in every legitimate way the improvement of this noble and useful animal. Still this interest must be so held in check as not to allow it to overshadow others of at least equal importance; as in our opinion to permit this would be a departure from the object of the Society as defined in the first article of the constitution, where it is set forth as being "to promote the improvement of agriculture and its kindred arts." In itself considered, it is as legitimate to test a horse for speed as for any other quality; but viewed in its relation to agriculture, this quality is of much less importance. Still, I do not wish to be understood as desiring to have the premiums for this class cut down. I only desire that in connection with the trials of speed something could be done to prevent what is immoral and unlawful. This is due to ourselves as representing the Society, and as the custodians of its good name; it is due to the people at large; it is due also to those gentlemen who are striving to improve the horse, and to whom the country is much indebted for what they have accomplished.

The interests of these men are identical with our own, and as a class they are as much opposed as we are to betting and gambling, and equally desirous for its suppression. I would therefore recommend a careful revision of the rules governing this class. Would it not be well to require that during trials of speed that the spectators be required to occupy the grand stand, excepting such as are permitted on the judges' stand, and that they be under the strict surveillance of the police and officers of the Society.

SHEEP.

The sheep is one of the most useful and profitable animals on the farm. And the men who have made the improvement of sheep a specialty and exhibited their flocks at our annual fair are among the best men we have. A very marked improvement has been achieved as a result of their labors, as shown by the census from time to time published. The average weight of fleece has been very nearly doubled within the last 25 years.

This class should receive close attention and liberal encouragement.

SWINE.

Exhibitors of swine are of necessity put to a great deal of trouble from the peculiar nature of the animal exhibited. They surely earn all they receive at the Fair. The vast extent and rapid growth of the interest represented by this class should not be overlooked. In 1873 the pork marketed in this State was 15,298,404 pounds, an increase of 46 16-100 per cent from 1863.

The hog we must have to grease the wheels of society. Let us do what we can to encourage his owner.

One year ago the premium list from Division E, Class 31, to Division N, Class 66, was carefully revised, and the result was highly favorable, as seen in the large exhibit made at our last fair. The able superintendence of the different departments will, doubtless, make recommendations in the above classes better calculated for the instruction and guidance of the Board than anything I might recommend.

NORTHERN EXHIBIT.

The department known as the Northern Exhibit proved to be a very useful and attractive feature of our last Fair. I feel confident that in recommending the continuance of the same general plan with reference to it, the recommendation will meet with your hearty indorsement. I think in this way we can do a much needed and highly important work in bringing more prominently into notice the northern counties of the State, and in some measure arrest the constantly flowing stream of emigration to the west and direct its course to lands in our own State, where the judicious expenditure of labor and capital will be liberally rewarded, and where the location with reference to markets, school houses, etc., is greatly superior to what they are likely to find further west.

RULES.

Each Superintendent should understand that within the limit of his department he is invested with judicial authority. It is therefore important that he should be familiar with the rules pertaining to the department that he may clearly and readily give the exhibitors such explanation as they may require, and that when called upon for a decision on any matter referred to him he may be able to decide promptly and in accordance with the rules. This will save both time and temper, and greatly aid in pleasantly carrying out the general plan of the Fair.

POMOLOGICAL SOCIETY.

The Pomological Society has done a great work in promoting the interests that naturally come under its care. That work it is still carrying forward most efficiently. It richly deserves, as it will doubtless receive, the same generous treatment that it has in the past.

AGRICULTURAL COLLEGE.

At our last annual meeting President Webber recommended that the Executive Board of this Society visit the Agricultural College once or oftener during the year in order to our becoming personally familiar with the workings of the institution. This recommendation was adopted, and a visit was made to the College during the past summer. This we regard as having been a highly profitable, as it was an exceedingly pleasant meeting. As citizens of Michigan, we are justly proud of our State institutions. But little has occurred in connection with any of them to call forth censure, while there is much to be commended. The aims and objects of the Agricultural College make it more essentially a co-worker with us. The opposition and indifference on the part of the people which the College has had to contend against, is gradually passing away. Much of this feeling was doubtless attributable to the ignorance of many in regard to what the College was doing in the interest of agriculture. Since the plan has been adopted of holding a series of institutes each winter, an excellent opportunity has thus been afforded for the farmers and the College faculty to make each other's acquaintance. A feeling of mutual respect and sympathy has been begotten, and the work of the College is appreciated as it has never been before. I believe it is important that this Board should be intimately acquainted with the workings of the College, with its Professors and Board of Control, and do, therefore, strongly recommend the continuance of the plan inaugurated last year.

FINANCIAL POLICY.

Hitherto the Society can hardly be said to have had any financial policy other than to receive and disburse. When we consider the large outlay connected with the annual fair and the liability from various causes, but chiefly from unfavorable weather, to have such a shortage in the receipts as to render the Society for the time being unable to meet its obligations, we cannot but regard it as unwise to have such an excessive premium list as to swallow up all the available funds, even of our most successful Fairs. In my opinion the premium list for some time to come should not exceed $10,000 each year. Then let the Society make a permanent and secure investment of from $25,000 to $30,000, of which only the accrued interest could be drawn when necessary to meet the obligations of the Society.

The State Agricultural Society is of the people and for the people, and it has ever been the aim of its officers to run it in the interests of all classes and to make it helpful to all the various industries of our State.

This shall be its aim, and whatever of fitness we bring to the work from the experience of the past shall be cheerfully devoted to making the next fair all that it can be made as an exhibition of the best results attained in agriculture, mechanism, and art.

The roll of the new Committee was called by the Secretary and the following members answered: President Phillips, Treasurer Dean, Secretary Johnstone, and Messrs. Sterling, Rising, Hanford, Hall, Cobb, Fralick, Hyde, Manning, Phillips, Smith, Burrington, Wood, Parsons, Angel, Harrison, and McKay; ex-presidents Shoemaker, Baxter, C. Kipp, and Webber.

Mr. Baxter moved that the addresses of the retiring President and the President elect be referred to a special committee of three, to recommend a subdivision of subjects.

The motion prevailed and the Chair appointed as such committee Messrs. Baxter, Shoemaker, and C. Kipp.

The Secretary, R. F. Johnstone, then read his annual report as follows:

REPORT OF SECRETARY R. F. JOHNSTONE.

At the close of the official year of 1878 there was reported by the Treasurer and Finance Committee as a balance on hand, $19,027.91; during the past year the Treasurer has received as per his report, $33,419.23; the total amount being $52,447.14.

The disbursements during the past year have been as follows, and charged to the following named accounts. The details are herewith submitted to the Executive Committee in schedule. A statement of the checks drawn for the payment of accounts as audited by the Business Committee, and countersigned by the Chairman of that Committee, amounts to $19,746.29.

The total number of business checks issued was $19,746.29, and the record of them is in the register of accounts for 1879, and on the stubs for each check drawn.

The total amount of the premiums offered by the Premium List of the Society for 1879 was $13,035.50, and the total amount of the checks drawn for the premiums in accordance with the following rule on page 30 of the Premium List for 1879:

"5. Committee will examine the premium list with care; they will in no case award a premium where there is no merit, though there be no competition, and in cases of partial merit, a second or third premium may be awarded, though no first or second premium be given. They are requested to make such recommendations as circumstances or their experience may suggest, and recommend discretionary premiums, of which notice shall be given to the exhibitor; but all discretionary or special premiums shall be reported to the Executive Committee, and shall be approved by them before being announced or awarded."

Under this rule the premium account stands as follows in the table below, which contains the amounts offered in each division, the amounts paid in each division, and also a statement of the medals and diplomas as they have been offered and issued; a full and detailed statement giving the number of the check, name of the party to whom issued, and of the medals and diplomas, is herewith submitted and marked "B;" reports of the premium checks issued by the Secretary and approved by the President, in accordance with the awards reported by the Superintendents of the several divisions of the annual exhibition for 1879, of which the following is a summary:

SUMMARY OF THE PREMIUMS OFFERED AND PAID IN EACH DIVISION OF THE EXHIBITION OF 1879.

Division.	Offered.	Awarded.
A—Cattle	$3,503 00	$2,514 00
B—Horses	3,453 00	2,948 00
C—Sheep	1,201 00	1,982 00
D—Hogs	556 00	526 00
E—Poultry	348 00	249 00
F—Farm Products, etc.	559 00	495 00
G—Dairy Products, etc.	276 00	242 00
H—Farm Implements	703 00	647 00
I—Vehicles	146 00	128 00
J—Machinery	282 00	221 00
K—Manufactured Goods	824 00	379 00
L—Musical Instruments	23 00	13 00
M—Paintings, Needlework	835 00	423 50
N—Miscellaneous	86 00	39 00
O—Children's Department	45 50	45 50
Total	$13,035 50	$10,042 00

LIST OF MEDALS AND DIPLOMAS OFFERED AND AWARDED.

Division.	MEDALS. Offered.	MEDALS. Awarded.	DIPLOMAS. Offered.	DIPLOMAS. Awarded.
A—Cattle	--	--	7	6
D—Swine	--	--	3	3
H—Farm Implements	2	1	1	1
J—Machinery	27	22	32	9
K—Furniture	1	1	2	2
L—Musical Instruments	--	--	32	5
M—Embroidery, etc.	--	--	2	1
N—Miscellaneous	2	1	--	--
Total	32	14	77	26

During the exhibition a large, in fact an unusually large number of awards were made by the several committees of judges, in accordance with the power which the rules of the Society as published in the premium list gave them. These awards have not yet been issued. They include premiums of money, medals, and diplomas. There is no power vested either in the President, the Business Committee, or the Secretary to issue them till after they have been approved by the Executive Committee in full session. I have prepared complete lists of them by the divisions and classes in which they belong, and submit them to you for your consideration. The detailed lists accompany this report, but a summary that will afford a clear view of the numbers, and the amount is herewith presented:

SUMMARY OF DISCRETIONARY PREMIUMS SUBMITTED AT THE ANNUAL EXHIBITION OF 1879.

Division.	
B—Horses	4
E—Poultry	44
F—Farm and garden products	23
G—Dairy and other products	32
H—Farm implements	51
I—Vehicles	16
J—Machinery	63
K—Manufactured goods	43
L—Musical instruments, etc	40
M—Painting, needlework, etc	131
N—Miscellaneous	57
Total premiums	504

Included in these awarks are 24 medals and 80 diplomas, leaving a balance of 400 to which awards have been made in money, or which have not been recommended by the committees for any sum.

The State exhibition of 1879 was in all respects probably the greatest event of the kind that has ever been held in the State. Its accommodations were the most perfect, the buildings were the most numerous and the best adapted for the show of the entries in all the divisions. Where there were some lacks in space and in buildings last year, the additions to the buildings this year gave ample space not only for the convenience of the visitors, but also for the display of the entries made by the members.

Each division had a full complement of entries, and on summing them up we are enabled to make the following as the list:

DIVISION A.—CATTLE.

Class.		
1—Short-horns, 11 herds	211	
2—Devons, 1 herd	32	
3—Herefords, 2 herds	21	
4—Ayrshires	14	
5—Jerseys, 3 herds	60	
6—Galloways, 2 herds	20	
7—Holsteins, 1 herd	27	
8—Graves, 8 herds	93	
9—Work cattle	17	
10—Fat cattle	10	
11—Herds	24	
		505

DIVISION B.—HORSES.

Class.		
12—Thoroughbreds	20	
13—Horses of all work	95	
14—Roadsters	178	
15—Driving horses	53	
16—Draught horses	54	
17—Carriage horses, including Board of Trade	60	
18—Breeding stallions	38	
19—Mares and geldings	76	
20—Stallions with show of colts	8	
		582

DIVISION C.—SHEEP.

Class.		
21—Thoroughbred American Merinos	50	
22—Merinos	68	
23—Fine wool grades	32	
24—Southdowns	25	
25—Middle Wools, Shropshire Downs	29	
26—Leicesters	29	
27—Cotswolds	28	
28—Coarse wool grades	15	
29—Fat sheep	25	
	——	301

DIVISION D.—SWINE.

Class.		
30—Berkshires	40	
Essex	32	
Suffolks	35	
Poland Chinas	17	
Chester White	16	
Fat hogs	12	
	——	152

DIVISION E.—POULTRY.

64 varieties		424

DIVISION F.—GRAIN, SEEDS AND VEGETABLES, FLOUR, ETC.

Class.		
32—Grain and seeds	164	
Board of Trade entries	71	
33—Roots and vegetables	591	
34—Flour and meal	10	
	——	836

DIVISION G.—DAIRY PRODUCTS, ETC.

Class.		
35—Butter and cheese	47	
Special Thurber premium	20	
36—Sugar, honey and bees	65	
37—Bread, etc.	50	
38—Groceries	41	
	——	223

DIVISION H.—IMPLEMENTS.

Class.		
40—Plows	93	
41—Tillage implements	61	
42—Seed drills and plaster	50	
43—Haying and harvesting implements	92	
44—Apparatus threshing, etc.	126	
45—Miscellaneous	73	
46—Dairy and houshold apparatus	48	
	——	543

DIVISION I.—VEHICLES.

Class 47		76

DIVISION J.—MACHINERY.

Class.		
48—Machines	219	
49—New articles	13	
	——	232

DIVISION K.—MANUFACTURES.

Class.		
50—Home-made	76	
51—Materials, wool, flax, etc.	5	
52—Factory	28	
53—Dress	33	
54—Leather	47	
55—Furniture	145	
56—Stoves	39	
	——	373

DIVISION L.—MUSICAL AND PHILOSOPHICAL INSTRUMENTS.

Classes 57 and 58		69

DIVISION M.—WORKS OF ART, NEEDLEWORK, EMBROIDERY, ETC.

Class.		
59—Paintings and stationary	239	
60—Dress and ornaments	21	
61—Plain needlework	87	
62—Embroidery	192	
63—Crotchet work	85	
64—Hair and shell work, etc.	84	
65—Printing and book-binding	39	
		747

DIVISION N.

Miscellaneous	124

DIVISION O.

Children's Department	52
Total entries	5,249

The entries have been so large in Division M that it has been suggested that classes 50 and 65 should be placed together as one division, and that all the other classes now in Division M be made into another division.

In the cattle division the new rule which excluded show cattle from other States from competing in the breeding classes, and permitted them to enter in the class for herds worked very satisfactorily, and it is to be hoped that it will be continued for another year. Breeding cattle which furnish the State with the most of stock from which farmers improve their herds, ought not to compete with those animals which have been selected out to prepare as show cattle, and have been fully developed by feeding till they were useless for breeding purposes. In the other classes of live stock the rule works more of an injury to the exhibition, and is not the policy which should govern a great State Society which announces that its Fairs are open to the world. Its constitution declares that any person may become a member for one year by the payment of a dollar into its treasury. Its first rule also makes the same announcement. Is it not at least questionable whether all its members are not entitled to the same rights as any other member without qualification? This is a subject that evidently requires some consideration. No objection has ever been raised by the exhibitors of horses, sheep, swine or poultry, but yet they are debarred from exhibition by the breeders of other States, for reasons which apply to the cattle classes, but not to any other class of live stock.

The rules relative to the exhibition of horses require revision, and especially that one which demands that a two-year old stallion shall have been used during the season. Here also should be a definite set of rules for the government of the exhibitors, and a revision of the classification in connection with classes 16, 18, 19 and 20. There are no premiums offered for teams of draught horses. A large number of Clydesdales, Norman-Percherons and other heavy breeds are now represented in the State, and this addition should be made. A pair of draught horses was shown the past reason, and had to be placed among the non-ennumerated entries, the premium awarded it being discretionary.

It is very evident that the industries of the State have out-grown the premium list. The large number of discretionary awards, and of non-enumerated articles reaching in all 504, indicates that classifications in some of the divisions need extension and a thorough revision, especially if the annual exhibition should be held in this city for another year. In other respects there has been a general satisfaction with it, expressed by the members.

There was no feature of the annual exhibition which attracted more attention or more satisfaction than the display of the productions of the more northern counties of the State of Michigan, and known as the Northern Exhibits. We consider that few demonstrations of the progress made by the settlements in the upper part of the Lower Peninsula, by the facilities afforded by the extension of railroads, have ever been of more interest and pecuniary value to any State than the "Northern Counties Exhibits" at the State Fair of 1879. This department started and carried out by the railroads themselves, so very happily, and for which the Society is largely indebted to President Webber, has certainly earned the right to be continued, and to become a separate department, which would instruct the members and visitors each year in the growth of our own State, and would also serve to inform the people of other States and countries that there are millions of acres of lands within our borders which are only awaiting settlement to become as rich and prosperous as those sections which have been under cultivation during the past half century.

On motion of Mr. Baxter, the financial portion of the Secretary's report was referred to the Finance Committee, and the remainder of it to the committee appointed to apportion the address of the President.

The Treasurer, A. J. Dean, then submitted his annual report:

TREASURER'S REPORT.

PREMIUM CHECKS PAID.

January 12, 1880.

Check No.	Amount.	Check No.	Amount.	Check No.	Amount.	Check No.	Amount.
1	$20 00	46	$15 00	91	$5 00	136	$17 00
2	152 00	47	10 00	92	15 00	137	11 00
3	20 00	48	20 00	93	10 00	138	5 00
4	15 00	49	8 00	94	8 00	139	4 00
5	10 00	50	49 00	95	5 00	140	13 00
6	55 00	51	53 00	96	10 00	141	15 00
7	15 00	52	10 00	97	8 00	142	10 00
8	15 00	53	3 00	98	5 00	143	5 00
9	5 00	54	20 00	99	3 00	144	12 00
10	20 00	55	10 00	100	43 00	145	8 00
11	48 00	56	5 00	101	10 00	146	38 00
12	46 00	57	34 00	102	13 00	147	9 00
13	10 00	58	62 00	103	12 00	148	12 00
14	5 00	59	9 00	104	8 00	149	6 00
15	3 00	60	26 00	105	5 00	150	3 00
16	28 00	61	15 00	106	8 00	151	2 00
17	30 00	62	27 00	107	8 00	152	2 00
18	8 00	63	59 00	108	5 00	153	30 00
19	25 00	64	10 00	109	2 00	154	20 00
20	25 00	65	25 00	110	7 00	155	30 00
21	89 00	66	15 00	111	5 00	156	20 00
22	37 00	67	15 00	112	3 00	157	20 00
23	85 00	68	25 00	113	5 00	158	15 00
24	77 00	69	100 00	114	3 00	159	10 00
25	85 00	70	50 00	115	2 00	160	30 00
26	25 00	71	30 00	116	15 00	161	30 00
27	20 00	72	20 00	117	10 00	162	10 00
28	12 00	73	40 00	118	10 00	163	25 00
29	15 00	74	65 00	119	10 00	164	20 00
30	104 00	75	15 00	120	11 00	165	18 00
31	10 00	76	40 00	121	21 00	166	8 00
32	25 00	77	25 00	122	8 00	167	10 00
33	52 00	78	42 00	123	2 00	168	8 00
34	85 00	79	20 00	124	30 00	169	5 00
35	42 00	80	20 00	125	20 00	170	5 00
36	8 00	81	35 00	126	25 00	171	40 00
37	3 00	82	15 00	127	15 00	172	15 00
38	25 00	83	30 00	128	120 00	173	6 00
39	15 00	84	20 00	129	40 00	174	4 00
40	5 00	85	10 00	130	23 00	175	3 00
41	10 00	86	5 00	131	15 00	176	30 00
42	119 00	87	25 00	132	10 00	177	20 00
43	53 00	88	20 00	133	20 00	178	30 00
44	25 00	89	15 00	134	15 00	179	20 00
45	20 00	90	10 00	135	10 00	180	10 00

Check No.	Amount.	Check No.	Amount.	Check No.	Amount.	Check No.	Amount.
181	$20 00	244	$43 00	307	$2 00	370	$2 00
182	12 00	245	75 00	308	1 00	371	1 00
183	8 00	246	30 00	309	10 00	372	
184	12 00	247	54 00	310	6 00	373	2 00
185	8 00	248	77 00	311	2 00	374	3 00
186	4 00	249	15 00	312	1 00	375	5 00
187	10 00	250	6 00	313	4 00	376	16 00
188	7 00	251	12 00	314	1 00	377	12 00
189	3 00	252	8 00	315	1 00	378	8 00
190	75 00	253	10 00	316	11 00	379	4 00
191	50 00	254	24 00	317	8 00	380	8 00
192		255	44 00	318	1 00	381	6 00
193	30 00	256	5 00	319		382	4 00
194	20 00	257	8 00	320	2 00	383	2 00
195	10 00	258	5 00	321	3 00	384	10 00
196	20 00	259	8 00	322	4 00	385	25 00
197	15 00	260	5 00	323	1 00	386	20 00
198	10 00	261	89 00	324	1 00	387	15 00
199	100 00	262	11 00	325	9 00	388	10 00
200	75 00	263	14 00	326		389	5 00
201	125 00	264	6 00	327	2 00	390	6 00
202	50 00	265	18 00	328	6 00	391	
203	25 00	266	16 00	329	5 00	392	5 00
204	30 00	267	18 00	330	3 00	393	9 00
205	20 00	268	7 00	331	2 00	394	9 00
206	10 00	269	16 00	332	2 00	395	15 00
207	20 00	270	12 00	333	2 00	396	7 00
208	15 00	271	3 00	334	10 00	397	3 00
209	10 00	272	12 00	335	5 00	398	6 00
210	50 00	273	37 00	336	6 00	399	2 00
211	30 00	274	55 00	337	4 00	400	4 00
212	20 00	275	12 00	338	22 00	401	12 00
213	80 00	276	18 00	339	4 00	402	2 00
214	37 00	277	41 00	340	5 00	403	2 00
215	18 00	278	36 00	341	11 00	404	3 00
216	10 00	279	16 00	342	8 00	405	
217	48 00	280	35 00	343	3 00	406	5 00
218	8 00	281	54 00	344	5 00	407	3 00
219	4 00	282	31 00	345	3 00	408	5 00
220	20 00	283	13 00	346	50 00	409	8 00
221	13 00	284	2 00	347	3 00	410	5 00
222	15 00	285	3 00	348	5 00	411	3 00
223	10 00	286	6 00	349	3 00	412	76 00
224	30 00	287	4 00	350	31 00	413	25 00
225	11 00	288	5 00	351	6 00	414	10 00
226	27 00	289	1 00	352	3 00	415	5 00
227	4 00	290	3 00	353	2 00	416	2 00
228	19 00	291	2 00	354	2 00	417	25 00
229	15 00	292	2 00	355	5 00	418	5 00
230	10 00	293	1 00	356	5 00	419	5 00
231	3 00	294	18 00	357	70 00	420	8 00
232	14 00	295	1 00	358	53 00	421	2 00
233	12 00	296	2 00	359	49 00	422	3 00
234	32 00	297	5 00	360	10 00	423	3 00
235	4 00	298	4 00	361	11 00	424	50 00
236	8 00	299	2 00	362	3 00	425	25 00
237	5 00	300	3 00	363	19 00	426	10 00
238	35 00	301	7 00	364	26 00	427	
239	72 00	302	2 00	365	11 00	428	25 00
240	18 00	303	9 00	366	12 00	429	15 00
241	23 00	304	1 00	367	10 00	430	20 00
242	81 00	305	7 00	368	2 00	431	10 00
243	67 00	306	7 00	369	1 00	432	3 00

Check No.	Amount.	Check No.	Amount.	Check No.	Amount.	Check No.	Amount.
433	$4 00	496	$69 00	559		622	$3 00
434	5 00	497	10 00	560	$10 00	623	
435	15 00	498	5 00	561		624	
436	10 00	499	10 00	562		625	5 00
437	6 00	500	19 00	563		626	
438	2 00	501	9 50	564	3 00	627	
439	35 00	502	2 00	565		628	3 00
440	38 00	503	2 00	566		629	4 00
441	10 00	504	1 00	567	10 00	630	1 00
442	25 00	505		568	6 00	631	3 00
443		506	6 00	569	24 00	632	2 00
444	3 00	507	1 00	570	3 00	633	2 00
445	5 00	508	2 00	571	5 00	634	
446	2 00	509	50	572	6 00	635	2 00
447	10 00	510		573	2 00	636	1 00
448	20 00	511	10 00	574	3 00	637	2 00
449	35 00	512	7 00	575	4 00	638	2 00
450	10 00	513	5 00	576	5 00	639	1 00
451	30 00	514	7 00	577	15 00	640	2 00
452	2 00	515	7 00	578	8 00	641	2 00
453	2 09	516	10 00	579	4 00	642	1 00
454	2 00	517	12 00	580	3 00	643	2 00
455	1 00	518	2 00	581	5 00	644	3 00
456	1 00	519	1 00	582	7 00	645	2 00
457	1 00	520	5 00	583	7 00	646	2 00
458	1 00	521	13 00	584	41 00	647	2 00
459		522	6 00	585	2 00	648	
460		523	10 00	586	3 00	649	
461		524	12 00	587	2 00	650	
462		525	16 00	588		651	
463	1 00	526	3 00	589	2 00	652	
464	1 00	527	1 00	590	1 00	653	
465	1 00	528	2 00	591	14 00	654	
466	1 00	529	1 00	592	2 00	655	
467	1 00	530	5 00	593	7 00	656	
468	1 00	531	5 00	594	2 00	657	
469	2 00	532	3 00	595	2 00	658	
470	2 00	533		596	1 00	659	
471	3 00	534	48 00	597	3 00	660	11 00
472	5 00	535	55 00	598	3 00	661	
473	1 00	536	14 00	599	2 00	662	6 00
474	1 00	537	9 00	600	3 00	663	
475		538	5 00	601	2 00	664	3 50
476		539	11 00	602	3 00	665	1 00
477		540	10 00	603	4 00	666	2 00
478		541	2 00	604		667	1 00
479		542	8 00	605		668	2 00
480	16 00	543	2 00	606		669	2 00
481	5 00	544	23 00	607		670	3 00
482	9 00	545		608		671	2 00
483		546		609		672	2 00
484	6 00	547		610		673	3 00
485		548		611		674	1 00
486	6 00	549		612		675	2 00
487	3 00	550		613		676	1 00
488	31 00	551		614		677	2 00
489	6 00	552		615		678	1 00
490	6 00	553		616		679	2 00
491	3 00	554		617		680	4 00
492	10 00	555		618		681	2 00
493	5 00	556		619		682	
494	15 00	557		620	3 00	683	1 00
495	1 00	558		621	5 00	684	

Check No.	Amount.	Check No.	Amount.	Check No.	Amount.	Check No.	Amount.
685		721		757	$2 00	792	$1 00
686		722		758		793	1 00
687		723		759		794	3 00
688		724		760		795	1 00
689		725		761		796	4 00
690		726		762		797	2 00
691		727	$6 00	763		798	2 00
692		728	4 00	764		799	2 00
693		729	8 00	765		800	1 00
694		730	2 00	766		801	3 00
695		731		767		802	1 00
696		732	2 00	768		803	5 00
697		733	2 00	769		804	1 00
698		734		770		805	3 00
699		735		771		806	1 00
700	$2 00	736	2 00	772		807	1 00
701	1 00	737	2 00	773		808	1 00
702	3 00	738	2 00	774		809	50
703	2 00	739		775		810	
704	14 00	740	2 00	776		12½	17 00
705		741	2 00	777		212A	75 00
706	3 00	742		778		212B	50 00
707	4 00	743		779		212C	25 00
708	3 00	744		780		212D	50 00
709	1 50	745		781		212E	30 00
710	2 00	746		782		212F	20 00
711	1 00	747		783		190A	100 00
712	2 00	748	5 00	784		190B	75 00
713	1 00	749		785		190C	50 00
714	1 50	750	3 00	786		159½	10 00
715		751	15 00	787	1 00	354½	10 00
716		752	5 00	788	3 00	494½	3 00
717		753	6 00	789	4 00	495½	10 00
718		755		790	2 00		
719		754	5 00	791	2 00	Total	$9,989 00
720		756					

BUSINESS ORDERS.

Order No.	Amount.	Order No.	Amount.	Order No.	Amount.	Order No.	Amount.
1	$7 00	21	$1 25	41	$83 33	61	$89 86
2	15 96	22	10 90	42	30 00	62	41 20
3	150 00	23	8 50	43	10 00	63	313 75
4	18 00	24	8 20	44	1 50	64	115 25
5	16 25	25	8 00	45	83 33	65	15 40
6	4 00	26	7 20	46	11 61	66	83 33
7	261 85	27	3 00	47	9 00	67	8 75
8	5 60	28	3 00	48	4 55	68	6 50
9	6 50	29	83 33	49	34 50	69	140 50
10	3 00	30	1 40	50	23 35	70	13 05
11	4 00	31	2 25	51	28 25	71	29 00
12	10 00	32	8 80	52	83 33	72	10 80
13	2 70	33	17 00	53	355 99	73	38 88
14	2 40	34	4 90	54	83 33	74	204 62
15	7 50	35	205 00	55	5 00	75	199 45
16	6 50	36	80 00	56	240 12	76	20 00
17	4 70	37	30 75	57	77 00	77	7 37
18	16 00	38	17 80	58	20 05	78	100 00
19	4 75	39	300 00	59	150 00	79	263 12
20	1 00	40	30 00	60	200 00	80	12 50

Order No.	Amount.	Order No.	Amount.	Order No.	Amount.	Order No.	Amount.
81	$224 87	144	$7 25	207	$30 00	270	$36 00
82	42 00	145	6 50	208	400 00	271	109 27
83	83 33	146	14 00	209	12 15	272	6 75
84	12 00	147	43 90	210	20 00	273	57 80
85	4 50	148	372 50	211	10 00	274	33 00
86	113 39	149	28 58	212	7 20	275	49 50
87	36 50	150	27 75	213	22 50	276	7 50
88	28 76	151	20 75	214	2 60	277	120 00
89	28 45	152	36 20	215	22 50	278	26 00
90	18 00	153	9 50	216	6 00	279	18 00
91	86 00	154	5 60	217	25 00	280	16 15
92	28 00	155	25 00	218	5 00	281	10 17
93	9 08	156	12 51	219	44 42	282	48 44
94	4 30	157	2 00	220	17 00	283	500 00
95	126 01	158	5 10	221	1 25	284	5 92
96	27 20	159	6 50	222		285	5 00
97	1 00	160	95 78	223	82 00	286	6 15
98	4 15	161	13 22	224	21 60	287	14 30
99	5 70	162	5 60	225	40 00	288	5 00
100	2 35	163	34 50	226	146 12	289	1 65
101	23 00	164	50 00	227	42 00	290	4 00
102	4 00	165	9 00	228	714 03	291	72 00
103	48 00	166	150 00	229	350 00	292	10 00
104	83 33	167	15 00	230	31 00	293	10 00
105	8 25	168	7 00	231	73 00	294	10 00
106	4 25	169	11 00	232	4 16	295	8 00
107	63 40	170	5 00	233	3 25	296	8 00
108	83 69	171	26 20	234	12 50	297	12 00
109	8 20	172	15 00	235	23 35	298	10 00
110	9 90	173	12 00	236	8 00	299	12 65
111	698 87	174	2 00	237	1 25	300	16 00
112	3 50	175	60 00	238	5 27	301	28 00
113	150 00	176	16 00	239	6 41	302	32 00
114	19 42	177	43 94	240	6 20	303	449 90
115	5 00	178	10 50	241	2 50	304	182 25
116	84 00	179	15 00	242	10 00	305	6 00
117	814 23	180	75	243	24 00	306	143 25
118	17 53	181	8 00	244	21 95	307	5 60
119	13 10	182	8 00	245	25 00	308	63 50
120	15 76	183	83 33	246	53 50	309	29 00
121	11 24	184	47 00	247	7 50	310	1 00
122	15 63	185	46 00	248	21 00	311	274 09
123	16 76	186	16 00	249	25 00	312	49 20
124	12 11	187	14 00	250	25 00	313	605 00
125	16 34	188	23 00	251	20 00	314	19 56
126	1,028 27	189	23 00	252	2 72	315	3 00
127	24 37	190	15 50	253	11 80	316	8 00
128	63 88	191	10 00	254	15 00	317	12 00
129	7 00	192	22 00	255	44 42	318	38 85
130	17 00	193	25 00	256	10 25	319	30 00
131	5 00	194	26 25	257	12 00	320	130 66
132	5 78	195	19 00	258	7 00	321	39 41
133	264 16	196	11 25	259	20 00	322	6 00
134	64 32	197	12 50	260	11 90	323	18 15
135	90 02	198	31 50	261	13 00	324	22 95
136	10 00	199	26 00	262	6 00	325	7 67
137	10 00	200	24 00	263	35 00	326	2 00
138	18 00	201	80 00	264	59 75	327	67 10
139	10 00	202	60 00	265	9 50	328	27 00
140	11 00	203	15 00	266	22 05	329	4 50
141	1 38	204	36 00	267	42 00	330	12 75
142	7 10	205	51 00	268	16 00	331	166 00
143	15 40	206	21 04	269	15 00	332	29 50

Order No.	Amount.	Order No.	Amount.	Order No.	Amount.	Order No.	Amount.
333	$15 00	344	$6 99	355	$83 33	366	$30 00
334	22 15	345	23 00	356	50 00	367	7 58
335	77 50	346	26 00	357	205 00	368	98 13
336	178 63	347	83 33	358	5 01	369	5 00
337	4 75	348	58 26	359	3 00	370	126 00
338	30 00	349	26 00	360	5 00	371	7 50
339	20 35	350	9 52	361	70 05	372	30 00
340	9 60	351	58 00	362	3 50	375	83 33
341	73 19	352	2 00	363	144 45		
342	9 00	353	2 33	364	13 50	Total	$19,672 82
343	9 80	354	5 75	365	34 13	Jan. 7, 1880.	

POMOLOGICAL PREMIUM CHECKS.

Check No.	Amount.	Check No.	Amount.	Check No.	Amount.	Check No.	Amount.
1	$60 00	24	$0 75	46	$5 25	68	$2 00
2	1 25	25	5 00	47	1 50	69	1 00
3	11 00	26	31 75	48	2 00	70	75
4		27	84 50	49		71	50
5	75	28	8 00	50	1 75	72	50
6	2 50	29	9 75	51	5 75	73	3 00
7	29 50	30	2 50	52	11 75	74	2 75
8	1 00	31	1 75	53	75	75	2 25
9	1 00	32	36 00	54	3 00	76	5 25
10	6 50	33	17 00	55	4 50	77	5 00
11	78 50	34	9 50	56	3 00	78	5 00
12	25	35	7 00	57	2 00	79	4 00
13	1 00	36	35 00	58	1 25	80	35 00
14	11 20	37	12 00	59	2 75	81	25 00
15	3 25	38	39 25	60	14 00	82	
16	2 00	39	37 50	61	1 75	83	3 00
17	46 50	40	17 00	62	2 00	84	3 00
18	67 75	41	27 00	63	75	85	2 00
19	3 25	42	6 50	64		86	2 00
20	3 00	43		65	75	87	2 00
21	1 50	44	6 00	66	50		
22	1 00	45	10 00	67	1 00	Total	$917 20
23	75						

SUMMARY.

Statement of Treasurer Michigan State Agricultural Society.

January 12, 1880.

RECEIPTS.

1879.				
Jan. 14.	By	Balance, cash on hand at settlement		$19,027 91
		Gate receipts	$26,286 30	
		Gate receipts (G. W. R. R. coupons)	79 75	
		Received from Henry Fralick, Grand Stand col	3 00	
				26,369 05
		Received from J. M. Sterling, acc't booth rent, etc.	$5,804 00	
		Received from J. M. Sterling, acc't North'n Exhibit	83 78	
		Received from J. M. Sterling, account check room	44 40	
		Received from J. M. Sterling, account packet boat	16 00	
				5,948 18
		Received of R. F. Johnstone, Secretary, Membership Tickets		1,082 00
		Received of R. F. Johnstone, Secretary, Life Memberships		20 00
Total				$52,447 14

PAYMENTS.

Paid Business Orders	$19,672 82	
Premium checks	9,989 00	
Premium checks, "Pomological"	917 20	
Old Premium checks, 1878, and 1876	17 40	
Old Pomological Premium checks	1 00	
		$30,597 42
Balance, cash on hand		$21,849 72

A. J. DEAN,
Treasurer.

The report of the Treasurer was referred to the Finance Committee, who submitted the following report:

REPORT OF FINANCE COMMITTEE.

To the President and Executive Committee of the State Agricultural Society:

The undersigned, your Finance Committee, to whom was referred the foregoing account of the Treasurer of said Society, respectfully report that we have compared said account with the vouchers accompanying the same, and the stubs with the checks, and find them to agree and the accounts correct; and that we have examined the Treasurer's ticket account and find that satisfactory and correct; and we further report that, at the commencement of the annual Fair in September last, your committee carefully counted all the tickets and compared the number and kinds, and found them correct with the sworn statement of the printer before delivering them to the Treasurer, for which we took his receipt. At the close of the Fair all the tickets not returned to your committee by said Treasurer were counted and paid for by him to said Society, and all the tickets then on hand after such adjustment were destroyed by your committee.

All of which is respectfully submitted.

HENRY FRALICK,
F. V. SMITH,
E. W. RISING,
Finance Committee.

DETROIT, January 13, 1880.

J. M. Sterling, Chairman of the Business Committee, submitted the report of that committee, as follows:

STATEMENT OF BUSINESS COMMITTEE.

Statement of Business Committee in detail, to the Executive Committee of the Michigan State Agricultural Society, made January 12, 1880, at the Annual Meeting.

STATE POMOLOGICAL SOCIETY.

Date.	No. of Order.	Total.
Feb. 18.	39	$300 00
July 4.	60	200 00
Nov. 4.	208	400 00
5.	283	500 00
Total.		$1,400 00

FORAGE.

Sept. 22.	118	Hay, J. McFarlin	$17 53
	119	" S. Mapes	13 10
	120	" J. Shafer	15 76
	121	" John Nickel	11 24
	122	" R. Donaldson	15 63
	123	" S. Ford	16 76
	124	" P. Steffs	12 11
	125	" Jas. Chevey	16 34

Date.	No. of Order.		Total.
Sept. 22.	126	Hay and Straw, C. C. Behan	$1,028 27
	127	“ W. Conley	24 37
	128	“ J. Camps and others	63 88
	129	“ T. McDonald	7 00
	130	“ Herback & Badger	17 00
	131	“ C. J. Trombley	5 00
	132	Oats, H. J. Culver	5 78
Nov. 4.	219	“ Wm. Bickford	44 42
5.	241	Hay, E. S. Rexford	2 50
	247	Stabling, J. H. Morris	7 50
	255	Teaming, E. W. Rising	44 00
	265	Hay, A. Schenback	9 50
	273	Forage, R. C. Judd & Son	57 80
	300	“ L. Reed	16 00
	302	“ W. Conley	32 00
	328	Freight on Hay, M. C. R. R.	16 00
Total			$1,499 49

POLICE.

Date.	No. of Order.		Total.
Sept. 22.	178	V. W. Rising	$10 50
	181	John Tull	8 00
	182	J. M. White	8 00
Nov. 5.	234	Ans. Whitmore	12 50
	304	Sundry Police account rendered	182 25
	338	Chas. Heath	30 00
Total			$251 25

GATES.

Date.	No. of Order.		Total.
Sept. 22.	136	John Weeman	$10 00
	137	Thos. Doyle	10 00
	138	T. C. Barber	18 00
	139	G. S. Wakefield	10 00
	140	A. Strong	11 00
Nov. 4.	227	S. Babcock and others	42 00
5.	254	C. T. Allen	15 00
	292	F. W. Cleveland	10 00
	293	John Pranstaller	10 00
	294	E. W. Frisbie	10 00
	295	A. A. Dibble	8 00
	296	Geo. Behan	8 00
Nov. 4.	297	H. E. Hyde	12 00
	298	John Lunsburgh	10 00
	316	J. J. Ellis	8 00
Total			$192 00

RENT OF GROUNDS AND RIGHT OF WAY.

Date.	No. of Order.		Total.
Sept. 22.	164	D. C. Thompson, Ground	$50 00
Nov. 4.	217	Wm. Faxon, Ground	25 00
5.	229	Wm. Faxon, Ground	300 00
		R. R. Right of Way	50 00
Total			$425 00

MUSIC.

Date.	No. of Order.		Total.
Nov. 5.	277	Detroit Opera House Band	$120 00

EXECUTIVE COMMITTEE EXPENSES.

Date.	No. of Order.		Total.
April 15.	46	W. L. Webber (1878)	$11 61
July 5.	67	Michigan Exchange Bill	8 75
7.	68	F. M. Manning	6 50

Date.	No. of Order.		Total.
Aug. 28.	87	W. G. Beckwith and others	$36 50
	94	Stationery	4 30
Sept. 4.	109	Wm. Ball	8 20
	145	H. O. Hanford	6 50
	151	D. W. Howard	20 75
	152	J. W. Childs	36 20
	153	J. Q. A. Burrington	9 50
	154	Wm. Ball	5 60
	171	J. M. Sterling	26 20
Nov. 4.	235	W. H. Cobb	23 35
	237	H. O. Hanford	1 25
	239	F. M. Manning	6 41
	240	Henry Fralick	6 20
	253	Abel Angel	11 80
	256	E. W. Rising	10 25
	257	W. G. Beckwith	12 00
	258	A. F. Wood	7 00
	260	Chas. Kipp	11 90
	266	A. O. Hyde	22 05
	280	T. D. Dewey	16 15
	281	Geo. W. Phillips	10 17
	348	W. L. Webber	58 26
1878.			
Jan. 10.	382	Russell House Bill	8 25
Total			$385 65

STEAM POWER AND SHAFTING.

Date.	No. of Order.		Total.
Sept. 22.	146	D. Donley, Fireman	$14 00
	147	A. Brusch, Engineer	43 90
	148	R. W. Hall, Engine and Boiler	372 50
	149	Mead & Co., Repairing Boiler	28 58
	150	Carrol Bros., line Shafting	27 75
Nov. 5.	310	Guy F. Hinchman, Tallow	1 00
	311	G. S. Wormer & Son, Shafting	274 09
	323	O. W. Shipman, Fuel	18 15
	335	Fulton Iron Works, Field Power	77 50
Total			$857 47

LIVERY.

Date.	No. of Order.		Total.
Nov. 4.	230	D. O'Connor	$31 00
	231	J. H. Morris	73 00
Total			$104 00

SWITCHING.

Date.	No. of Order.		Total.
Feb. 18.	36	Murphy, Avery and others, 1878	$80 00
Nov. 4.	218	A. Underwood, 1878	5 00
	313	M. C. Railroad, 1879	605 00
Total			$690 00

HOTELS AND BOARD.

Date.	No. of Order.		Total.
Sept. 22.	177	Mary Bickford	$43 94
Nov. 4.	220	Mary Bickford	17 00
5.	228	Russell House	714 03
	267	Mrs. Bennett, Gate-keeper	42 00
	274	Mrs. Bennett, Gate-keeper	33 00
	275	Mrs. Bennett, Police	7 50
	276	Mrs. Bennett, Treas. Clerk	49 50
	331	Wm. Boden, R. R. men and help	166 00
	349	Russell House	26 00
Total			$1,098 97

EXPENSES—WINTER MEETING.

Date.	No. of Order.		Total.
Feb. 18.	4	Henry Fralick, paid for counting tickets	$18 00
	7	Michigan Exchange	261 85
	8	A. J. Dean	5 60
	9	E. O. Humphrey, Hotel Bill	6 50
	10	F. M. Manning	3 00
	11	T. D. Dewey	4 00
	12	W. G. Beckwith	10 00
	13	Wm. Ball	2 70
	14	H. J. Kipp	2 40
	15	J. Q. A. Burrington	7 50
	16	E. W. Rising	6 50
	17	F. V. Smith	4 70
	18	D. W. Howard	16 00
	19	Henry Fralick	4 75
	20	J. W. Childs	1 00
	21	B. O. Hanford	1 25
	22	M. Shoemaker	10 00
	23	W. H. Cobb	8 50
	24	Geo. W. Phillips	8 20
	25	A. F. Wood	8 00
	26	Abel Angel	7 20
	27	J. M. Sterling	3 00
	28	A. O. Hyde	3 00
	32	Stationery	8 80
	33	Printing, R. F. Johnstone	17 00
	34	Printing, R. F. Johnstone	4 90
Total			$435 00

HERD BOOKS.

July 29.	78	S. F. Allen	$100 00
Aug. 14.	84	Ira A. Butterfield	12 00
	215	Jersey Cattle Club	22 50
Total			$134 50

MEAL TICKETS.

Nov. 5.	303	W. H. Dewey	$155 67
		Carson & Brush	20 00
		S. B. Dixon	4 00
		C. Butler	2 00
		Baptist Church Society	24 32
		Young People's Society—Baptist Church	83 33
		Brown Bros. & Co.	2 00
		Mrs. Brennan	4 00
		Thos. Holden	4 33
		J. Linto	0 33
		A. E. Efferts	9 66
		Gagner & Duncan	0 66
		Mrs. Ren	4 66
		Geo. Shudler	0 66
		S. Partridge	1 00
		Sink & Co.	5 66
		Farbarian & Fox	19 99
		Simpkin Bros.	0 33
		J. Hogan	0 33
		J. F. Clemens	15 33
		E. Kane	1 00
		F. Grousback	4 00
		J. Youngblood	0 66
		Wm. Esser	8 33
		Working Women's Home	5 00
		Wm. Boden	42 33

Date.	No. of Order.		Total.
Nov. 5.	303.	Mrs. Medbury	$6 66
		Geo. Rickel	1 66
		D. B. Smith	1 33
		Mrs. Shafer	1 67
		D. Mulligan	19 00
			$449 90
Nov. 5.	320	Chas. Spahr	130 66
	325	W. H. Dewey	7 67
	326	Carson & Brush	2 00
26.	353	E. Stiling, Jr.	2 33
Total			$592 56

DECORATION.

Sept. 22.	155	Evergreens	$25 00
	156	Labor	12 51
	157	Making Flags	2 00
	158	Plants and Flowers	5 10
	159	Painting Signs	6 50
Nov. 4.	226	Allan, Sheldon & Co., Mosquito Bar, Cambric and Ribbon	146 12
5.	328	Freight on Evergreens	11 00
	238	H. Fralick, Sundries	5 27
	333	Flagstaffs	15 00
	334	Flags, G. F. Hinchman	22 15
	337	Labor	4 75
	252	Newcomb, Endicot & Co., Ribbons	2 72
Dec. 8.	352	Allan, Sheldon & Co.	2 00
Total			$260 12

LUNCH ROOM.

Sept. 22.	621	Joseph Venier, Fruit	$5 60
	163	Housekeeper, Cook and Waiter Girls	34 50
Nov. 5.	271	Hull Bros., Groceries and Provisions	109 27
	272	Tower Bros., Milk	6 75
	284	H. Cleveland, Butter	5 92
	344	R. W. King & Son, Crockery	5 99
	345	A. V. Diffinbaugh, Carving, etc.	23 00
Total			$192 03

MEDALS AND DIPLOMAS.

June 5.	55	M. S. Smith & Co., engraving medals	$5 00
7.	59	M. S. Smith & Co., medal ordered by Executive Committee	150 00
Dec. 18.	370	U. S. Mint, 25 silver medals	126 00
31.	371	Filling out diplomas	7 50
Total			$288 50

SECRETARY'S OFFICE EXPENSES PREVIOUS TO WINTER MEETING, 1879.

Jan. 17.	1	Secretary Thompson account	$7 00
2.	2	Secretary Thompson, salary, 1879	15 96
18.	3	Asst. Secretary Hinchman, 1879	16 25
	5	Asst. Secretary Field, 1878	150 00
	6	J. P. Thompson, duplicate tickets	4 00
Total			$193 21

SECRETARY'S OFFICE EXPENSES FOR YEAR ENDING AT WINTER MEETING, JAN. 12, 1880.

Date.	No. of Order.		Total.
Feb. 18.	29	Secretary, salary	$83 33
	30	Telegraph	1 40
	31	Repairs on desk	2 25
Mar. 24.	41	Secretary, salary	83 33
Apr. 11.	45	Secretary, salary	83 33
May 20.	52	Secretary, salary	83 33
June 12.	54	Secretary, salary	83 33
July 7.	66	Secretary, salary	83 33
Aug. 7.	83	Secretary, salary	83 33
Sept. 7.	104	Secretary, salary	83 33
Oct. 6.	183	Secretary, salary	83 33
	184	Assistant Secretary Hanford	47 00
	185	Assistant Secretary Gies	46 00
	186	Assistant Secretary Grelling	16 00
	187	Assistant Secretary Wilcox, Geo. C.	23 00
	189	Assistant Secretary Palmer	23 00
	190	Assistant Secretary Waterman	15 50
	191	Assistant Secretary Baily	10 00
	187	Assistant Secretary Collins	14 00
	192	Assistant Secretary McDowd	22 00
	193	Assistant Secretary Wakefield	25 00
	194	Assistant Secretary Wilcox, J. V. D.	26 25
	195	Assistant Secretary Brownell	19 00
	196	Assistant Secretary Hellwig	11 25
	197	Assistant Secretary Thompson	12 50
	198	Assistant Secretary Haddock	31 50
	199	Assistant Secretary Knowles	26 00
	201	Assistant Secretary McConnel	80 00
	202	Assistant Secretary McConnel	60 00
	204	Assistant Secretary Catwell	36 00
	205	Assistant Secretary Crippen	51 00
	206	Stationery	21 04
Nov. 4.	211	Office rent	10 00
	212	Telegraph	7 20
	214	Stationery	2 60
	225	Assistant Secretary McConnel	40 00
7.	347	Secretary's salary	83 33
Dec. 12.	355	Secretary's salary	83 33
	356	Office rent	50 00
	365	Cornwells, Price & Co., stationery	34 13
	367	E. B. Smith & Co., stationery	7 58
31.	373	Secretary's salary	83 33
	378	Express and telegraph	9 20
	380	Stationery	5 60
1880.			
Jan. 10.	381	Stationery	1 85
Total			$1,787 81

ASSISTANT SUPERINTENDENTS AND JUDGES.

Sept. 12.	167	Assistant Supt. of sheep	$15 00
22.	176	C. M. Cobb	16 00
Nov. 5.	200	Assistant Supt. of carriages	24 00
	259	W. H. Todd, poultry judge	20 00
	261	Assistant Supt. of Horses	13 00
	269	Assistant Supt. of poultry	15 00
	286	Assistant Supt. of dairy department	6 15
	282	Robt. Miller, cattle judge	48 44
	287	Assistant Supt. of horses	14 30
	299	Assistant Supt. of cattle	12 65
	301	Judge of sheep	28 00
Total			$212 54

PRINTING.

Date.	No. of Order.		Total.
Feb. 18.	35	W. E. Scripps, proceedings of winter meeting	$205 00
April 11.	43	Post and Tribune	10 00
	44	W. H. Thompson	1 50
	50	M. D. Hamilton & Son	23 35
July 7.	69	J. F. Hadger, premium lists	140 50
Aug. 28.	92	J. F. Hadger, premium lists	28 00
30.	97	J. F. Hadger, premium lists	1 00
	99	Post and Tribune	5 70
	100	Free Press	2 35
	101	W. E. Scripps	23 00
	102	Evening News	4 00
Sept. 22.	170	M. D. Hamilton & Son	5 00
Nov. 5.	264	A. H. Perkins	59 75
	278	Post and Tribune	26 00
	306	Post and Tribune, small bills	143 25
	330	J. F. Hadger	12 75
	346	Times and Expositor	26 00
Dec. 12.	362	Post and Tribune	3 50
	363	Free Press, large bills	144 45
	364	W. E. Scripps	13 50
	368	O. S. Gully & Co.	98 13
	354	J. F. Hadger, printing	5 75
Total			$982 48

BUSINESS COMMITTEE.

Feb. 18.	38	Meeting at Jackson	$17 80
Ap'l 28.	58	Stationery	4 55
June 26.	58	J. M. Sterling, expenses	20 05
Nov. 4.	223	Clerk of committee	82 00
5.	224	Meeting at Detroit	21 60
1880.			
Jan. 10.	383	J. M. Sterling	4 25
Total			$150 25

POSTAGE.

Ap'l 15.	47	Business Committee	$9 00
July 7.	70	Secretary's office	13 05
	71	Secretary's office	29 00
29.	76	Secretary's office	20 00
	77	Secretary's office	7 37
Aug. 28.	85	Business Committee	4 50
30.	98	Secretary's office	4 15
	103	Secretary's office	48 00
Sept. 4.	112	Business Committee	3 50
6.	115	Treasurer's office	5 00
22.	169	Business Committee	11 00
Oct. 6.	203	Secretary's office	15 00
Nov. 4.	216	Secretary's office	6 00
5.	285	Treasurer's office	5 00
	305	Treasurer's office	6 00
Dec. 12.	358	Treasurer's office	5 01
	359	Treasurer's office	3 00
	369	Business Committee	5 00
30.	379	Secretary's office	9 00
Total			$208 58

TREASURER'S OFFICE.

Nov. 5.	233	Stationery	$3 25
	236	E. W. Beckwith, clerk	8 00
	262	C. T. Allen, clerk	6 00

Date.	No. of Order.		Total.
Nov. 5.	270	T. F. Bradley	$36 00
	288	Revenue stamps	5 00
5.	289	Telegraphing	1 65
Dec. 12.	357	Sundry clerks' account rendered	205 00
12.	360	Revenue stamps	5 00
31.	375	Office expenses	14 07
	377	F. L. Seitz, clerk	10 00
		Total	$293 87

GENERAL EXPENSES.

Date.	No. of Order.		Total.
Feb. 18.	37	Wm. Stoner, care of grounds	$30 75
Mar. 24.	40	Wm. Stoner, care of grounds	30 00
31.	42	Wm. Stoner, care of grounds	30 00
Ap'l 30.	49	Wm. Stoner and McLaren, care of grounds	34 50
Sept. 6.	114	A. J. Dean, bill for northern exhibit	19 42
6.	165	J. L. Lyons, painting	9 00
22.	166	S. B. Wakefield, superintending booths and collecting rents	150 00
	168	F. Zabriske, ring tags	7 00
	173	W. S. Ingersoll, care of Marshal's barn	12 00
	174	Quilts for police	2 00
	175	S. B. Wakefield, horse and buggy	60 00
	179	Mrs. Wakefield, care of ladies' cottage	15 00
	180	E. B. Smith & Co., stationery	75
Nov. 4.	207	Wm. Stoner, care of ground	30 00
	210	Carrying mail	20 00
	221	Goodwin & Henry, posting bills	1 25
	232	Richmond & Backus, stationery	4 16
	251	Detroit omnibus line	20 00
	309	J. Dunn, sawdust	29 00
	315	Election expenses	3 00
	317	F. Zimmerman, President's clerk	12 00
5.	329	J. D. Walker & Co., posting bills	4 50
	332	H. Turner, furniture and mattresses	29 50
	339	Michigan Gas Co., lighting grounds	20 35
	342	Boat manager	9 00
	343	A. H. Wallis, counting tickets	9 80
	290	C. Berdan, music judge	4 00
	308	Wm. Bickford, clearing up grounds	63 50
	361	Wm. Suckert, stationery and binding	70 05
Dec. 12.	366	Wm. Stoner, care of grounds	30 00
30.	372	Wm. Stoner, care of grounds	30 00
	376	A. J. Dean's bill	9 50
	374	Posting bills	1 75
		Total	$801 78

MAPS.

Date.	No. of Order.		Total.
Aug. 28.	90	Survey and map	$18 00
30.	96	Engraving wood-cut of grounds	27 20
Nov. 4.	213	Diagrams of hall	22 50
	263	Printing maps	35 00
		Total	$102 70

POULTRY DEPARTMENT.

Date.	No. of Order.		Total.
Sept. 22.	141	W. S. Jones, account moving coops	$1 38
	142	W. S. Jones, account moving coops	7 10
	143	W. S. Jones, account moving coops	15 40
	144	W. S. Jones, account moving coops	7 25
		Total	$31 13

ART HALL.

Date.	No. of Order.		Total.
Nov. 4.	245	Thomas Evans	$25 00
5.	246	A. J. Brow	53 50
	248	A. J. Brow	21 00
	249	H. M. Park	25 00
	250	W. E. Briscoe	25 00
Total			$149 50

PRESIDENTIAL PARTY.

Nov. 5.	291	M. Duffy & Co., carriages	$72 00
	351	J. H. Morris, carriages	58 00
Total			$130 00

LANSING MEETING.

June 25.	57	Executive Committee meeting at Lansing	$77 00

MARSHALS.

Nov. 5.	242	Sumner Howard	$10 00
	243	J. D. Bloodgood	24 00
	244	C. L. Soper	21 95
	268	Horse for marshal	16 00
	279	E. W. Beckwith	18 00
Total			$89 95

FENCE, GROUNDS, AND WATER.

Ap'l 30.	51	Wm. Bickford, preparing grounds	$28 25
June 5.	53	Pay-roll	355 99
July 5.	63	Pay-roll	313 75
	65	Morton & Co., posts	15 40
24.	72	McLaren & Co., plow	10 80
Aug. 4.	79	Pay-roll	263 12
	80	Wm. Feen, labor	12 50
Sept. 4.	113	Thirty loads gravel	150 00
	106	W. E. Heames & Co., water lime	4 25
	107	Jas. York, water tanks	63 40
	110	Freight on water fixtures	9 90
22.	172	J. Francis, labor	15 00
Nov. 4.	209	Wooden water pipe	12 15
5.	307	Belle Isle Ice Co., ice	5 60
	319	Mower and wagon	30 00
	322	Detroit Truck Co., rolling	6 00
	324	W. S. Penfield, hose and truck	22 95
Nov. 5.	327	J. Flower & Bro., water pipe	67 10
	350	Monroe Gas Light Co., tools and fixtures	9 52
Total			$1,395 68

BUILDING.

June 21.	56	B. Whipple, lumber	$240 12
July 4.	61	B. Whipple, lumber	89 86
5.	62	Freight on lumber	41 20
	64	Carpenter work	115 25
24.	73	Freight on lumber	38 88
	74	B. Whipple, lumber	204 62
	75	B. Whipple, lumber	199 45
Aug. 4.	81	Carpenter work	224 87
	82	Freight on lumber	42 00
28.	86	Buhl, Ducharme & Co., hardware	113 39
	88	Freight on lumber	28 76

Date.	No. of Order.		Total.
Aug. 28.	89	Freight on lumber	$28 45
	91	B. Whipple, lumber	86 00
30.	93	Freight on lumber	9 08
	95	B. Whipple, shingles and lumber	126 01
Sept. 4.	105	Freight on lumber	8 25
	108	B. Whipple, lumber	83 69
	111	Carpenter work	698 87
	116	B. Whipple, lumber	84 00
6.	117	Carpenter work	814 23
22.	133	W. D. Morton, lumber	264 31
	134	A. Ross, lumber	64 06
	135	B. Whipple, lumber	90 22
	160	Detroit Glass Works, glass	95 78
	161	Detroit Glass Works, glass	13 22
Nov. 5.	312	J. W. Hubbard, painting and glazing	49 20
	314	Freight and lumber	19 56
	318	B. Whipple, lumber	38 85
	321	Boydell Bros., paint and oil	39 41
	366	Jacob Welz, hardware	178 63
	440	Freight on lumber	9 60
	341	Buhl, Ducharme & Co., hardware	73 19
Total			$4,212 92

SUMMARY STATEMENT.

State Pomological Society	$1,400 00
Forage	1,499 49
Police	251 25
Gates	192 00
Rent of ground and right of way	425 00
Music	120 00
Executive committee expenses	385 65
Power and shafting	857 47
Livery	104 00
Switching	690 00
Hotels and board	1,098 97
Expense of winter meeting	435 25
Herd Books	134 50
Meal tickets	593 56
Decoration	260 12
Lunch room	192 03
Medals and Diplomas	288 50
Secretary's office expense previous to winter meeting, 1879	193 21
Secretary's office for year ending at winter meeting, 1880	1,787 81
Assistant superintendents and Judges	212 54
Printing	982 48
Postage	208 58
Business committee expenses	150 25
Treasurer's office	293 97
General expense	801 78
Maps and survey	102 70
Poultry department	31 13
Art hall	149 50
Presidential party	130 00
Lansing meeting	77 00
Marshals	89 95
Fence, grounds and water	1,395 68
Building	4,212 92
Total	$19,746 29

MONEY RECEIVED BY BUSINESS COMMITTEE AND PAID OVER TO TREASURER FOR BOOTH RENT, PEDDLER'S PERMITS, ETC.

1879.		Lease No.	
Aug. 18.	Jacob Brand	1	$60 00
	Geo. Rickel	2	65 00
	Wm. Ney	3	80 00
	Carson & Brush	4	64 00
	J. F. Clemens	5	80 00
	Andrew Efferts	6	56 00
	Gagner & Duncan	7	56 00
	John Esser	8	60 00
	John Martz	9	60 00
	Geo. Shindler	10	60 00
	F. Lorkrosey	11	50 00
	Charles Schwartz	12	90 00
	Rush & Kloemhamer	13	64 00
	Fred Irion	14	80 00
	Young People's So. Bap. Ch.	15	120 00
	Gross, Mitchell & Co.	16	100 00
	Peter Rauder	17	80 00
	J. H. Simpkin & Bro.	18	56 00
	F. Rickle & Co.	19	80 00
	A. Kolthoff & Co.	20	80 00
	Wm. Armihamer & Co.	21	100 00
	A. R. Fielmer	22	28 00
	L. H. Adams	23	24 00
Aug. 19.	James Hogan	24	45 00
	Hermann, Hessler & Co.	25	80 00
	H. Godenau & Co.	26	80 00
	John Ketler	27	40 00
	J. Bostendorff	28	80 00
	Joseph Linto	29	88 00
	Chas. Butler & Co.	30	23 00
	Burbon & Leger	31	24 00
	Sames Copp & Co.	32	40 00
	J. W. Shafer	34	22 50
	Mrs. D. Cole	35	21 50
	Chas. Spahr	36	80 00
	E. Stiling, Jr.	37	48 00
	Thos. Holden	38	40 00
20.	Edward Kane	39	22 50
	John Rumley	40	80 00
21.	Fred Grisback	41	60 00
	Alford Rogner	42	30 00
	Wm. Boden	43	60 00
	A. R. Sink & Co.	44	60 00
22.	D. H. Reid	45	30 00
	J. Vogle	46	30 00
	H. Jacob	47	30 00
	Philip Smith	48	45 00
	D. Mulligan	49	21 00
	Working Women's Home	50	50 00
23.	W. H. Dewey	51	120 00
	F. Knorre & Co.	52	48 00
	Wm. Johnson	53	42 00
	James G. Coats	54	30 00
	J. G. Hutchins & Co.	55	60 00
	Stanley & Sonders	56	38 50
	P. J. Martin	57	14 00
27.	L. J. Partridge	58	24 00
	H. W. Bradley	59	21 00
	Farbarian & Co.	60	30 00
	John Bullion	61	23 00
	Charles Wiger	62	20 50
28.	Ochrmust & Freunt	63	80 00
	Mrs. Maloy	64	24 00

1879.		Lease No.	
Aug. 29.	Richard Giddy	65	$30 00
30.	Peter Mickels	66	30 00
	Albert Shotwell	67	60 00
Sept. 1.	Robert Morton	68	30 00
	J. Youngblood	69	48 00
	Jos. Deltloff	70	45 00
2.	John Badke	71	12 00
	Conrad Storkel	72	50 00
	Geo. Buckley	73	30 00
	Brown Bros. & Co.	74	40 00
3.	J. Mortinson	75	13 00
4.	C. Woods	77	42 00
	John P Long	78	39 00
5.	E. K. Akeass	79	18 50
	John Call	80	75 00
	H. E. Champion & Co.	81	30 00
8.	E. P. Collins	82	48 00
	John Wildie	83	36 00
	Mrs. Medbury	84	42 00
	A. G. Shafer	85	30 00
	D. Germain	86	125 00
	Geo. Goldsmith	87	48 00
9.	J. H. Stratton	88	12 00
	Jos. Snyder	89	48 00
	Mrs. Trunk	90	18 00
	R. R. Lansing	91	25 00
10.	Peter Roder	92	31 50
	James Commerford	93	23 00
	Herman Grunon	94	30 00
	William Albon	95	6 00
11.	Hallister & Baier	96	24 00
	Andrew McEnhail	97	34 00
	James Owens	98	48 00
	F. C. Alvord	99	20 00
	John Sutherland	100	30 00
12.	Conant & Flarity	101	12 00
13.	James A. Love	102	16 50
	J. Q. Adams	103	24 00
	N. Peterson	104	18 00
	H. J. Packer	105	10 50
15.	F. E. Wells	106	12 50
	O. S. Perkins	107	24 00
	Wm. Hanson	108	30 00
	H. Rice	109	15 00
	S. J. Spalding	110	12 00
	A. M. Johnson	111	20 00
	Frank Overbaker	112	21 50
	C. A. Cusson	113	5 00
	Bartlett & Pomeroy	114	15 00
	Schlesenger & Alterang	115	10 60
	C. Newberry	116	7 50
	Geo. Erick	117	15 00
	Curtis, Simons & Co.	118	12 50
	C. A. Owens	119	12 00
	A. Ingram	120	20 00
	F. W. Burton	121	15 00
	E. A. Davis	122	9 00
	D. B. Smith	123	30 00
	H. Dickson	124	10 00
	George Hanselmann	125	18 00
	E. W. Wiggins	126	125 00
	John Mercer	127	8 00
	Miller & Riker	128	25 00
	Brit & Edloff	129	15 00
	Davis & White	130	21 50
	L. Lulback	131	10 00

1879.		Lease No.	
Sept. 15.	E. S. Roe & Co.	132	$30 00
	J. Stoddard	133	15 00
16.	L. D. Canfield	134	12 50
	Ward & DeForest	135	30 00
	H. Seltz & Son	137	15 00
	Andrew Miller	138	25 00
	Weston & Snyder	139	10 00
	Enright & Hobert	140	7 50
	James G. Coats	141	6 00
	C. G. Hampton	142	10 00
	Total amount received for booth rent		$5,430 00

PEDDLER'S PERMITS.

Sept. 10.	F. C. Cooledge,—programmes	$15 00
	T. S. Reed,—jewelry, etc.	10 00
11.	Wm. Fischer, Jr.,—advertising	5 00
	D. C. Wilber,—nuts, etc.	12 00
13.	John Prochayke,—jewelry	10 00
	John Brown,—vegetable ivory	10 00
15.	O. Switzer,—fruit	10 00
	C. Hunselmann,—nuts, etc.	15 00
	Mrs. Tesher,—fruits and nuts	10 00
	Mrs. Kane,—pocket-books	5 00
	H. H. Clump,—corn husker	7 00
	F. J. Burr,—nuts	15 00
	J. D. Vanderford,—knives	10 00
	Charles Gippard,—fruit	10 00
16.	A. Sherigut,—books	5 00
	S. E. Perry,—whistles	5 00
	E. R. Dunlap & Co.,—gun and cigars	9 00
	Hase & Craft,—fruit	7 00
	M. Woolf,—cigars	5 00
	M. Cassels,—nuts	9 00
	Allen & Parks,—candy	9 00
	S. H. Sweet,—gun	10 00
	E. Loranger,—base ball	5 00
	J. D. Norris & Co.,—candy	10 00
	A. Stone,—fruit	5 00
	W. H. Hyde,—collars	10 00
	A. C. Vermett,—baloons	10 00
	D. Brown,—fruit	6 00
	Prof. Andrews,—medicine	15 00
	J. R. Steern,—books	6 00
	Thomas Pine,—stamps	5 00
	John I. Cochran,—cards	5 00
	L. E. Nabors,—ball and gun	6 00
	E. Foster,—pin and ball	7 00
	Unknown,—pin and ball	1 00
	H. Grover,—telescope	3 00
	W. Skellinger,—whips	10 00
	A. Davis,—lifter	10 00
	W. Truent,—rings	6 00
	S. D. Parsons,—fruit	3 00
		$325 00

Total from booths and permits		$5,755 00
Less discount on Canada money received of D. Germain	$4 50	
" " " " " C. Butler	3 20	
Total		7 70
Sum total		$5,747 30

Received from check room	$44 40	
" " Jennings' boat	16 00	
" " W. L. Webber for labor on northern exhibition building	83 78	
Received for kindling wood	23 00	
" " knives, forks, and spoons	5 50	
" " cambric	13 20	
" " mosquito bar	15 00	
Total		$200 88
Total amount paid Treasurer		$5,948 18

INVENTORY OF PROPERTY BELONGING TO THE MICHIGAN STATE AGRICULTURAL SOCIETY IN THE CITY OF DETROIT.

1 Main building	68x400	feet	
1 Mechanics' wing of main building	48x150	"	
1 Art or south wing of main building	48x160	"	
1 Pomological octagon building	60x60	"	
1 Annex to Pomological hall	24x96	"	
1 President and Secretary's office	20x24	"	
1 Annex to office	15x48	"	
1 Ladies' cottage	16x36	"	
1 Treasurer's office	12x16	"	
1 Treasurer's office	12x24	"	
1 Treasurer's office at Third street	12x16	"	
1 Carriage building	24x160	"	
1 Enclosed carriage building	23x96	"	
1 Implement building	24x200	"	
1 poultry house	20x96	"	
1 Check room	12x16	"	
1 Baggage room	12x16	"	
1 Cattle amphitheatre	80x80	"	
1 Judges' stand	14x14	"	
1 Grand stand	20x180	"	
1 Marshals' barn	24x32	"	
1 Freight office	12x16	"	
1 Postoffice and Police station	20x40	"	
1 Firemen's room	12x16	"	
1 Music stand	20x20	"	
1 Barn	25x120	"	
424 Single cattle stalls	5 ft. 4 in. x12	"	
13 Bull stalls	8x12	"	
263 Single horse stalls	5 ft. 4 in. x12	"	
100 Box stalls	8x12	"	
360 Sheep and Swine pens	5 ft. 4 in. x7	"	
1 Railroad platform and cattle shoot	17x80	"	
3 Water closets	8x32	"	
Platform and shelving in Northern Exhibit building	48x96	"	
The above buildings, including a few thousand feet on hand, contain 993,690 feet of lumber, and 457¼ thousand shingles, and have cost			$17,110 42
142 feet 2½ in. iron shaftings, couplings. and bearings in Mechanics' Hall, cost			274 09
Taken up and in main building, 400 feet iron shafting, couplings, and bearings for field power, cost			190 00
3 Fish aquariums are in main building (in bad order)			
2 Hhds. of glass jars for exhibition of cereals. 1 axe. 1 hand-saw			
3 Hammers. 1 post auger			
1 Carpenter's square			
2 Large sprinkling pots			
1 Dozen tin cups			
1 Land roller, cost			35 00
1 Drag, cost			10 00
1 Track scraper and grate, cost			10 25
1000 feet 3 in. water log			150 00

2154 feet wrought iron water pipe and fittings. 11 float valves, 9 half-inch brass bibs. 3 half brass cocks, cost, including plumber's bill	290 00
1 Road sprinkler, 3 10-bbl. cisterns	
2 40-bbl. cisterns, cost	63 40
1 Box department banners	
2 National flags	
6 Straw mattresses	
2 Cotton comforters	
1 Doz. wooden rakes	
1 Iron rake	
190 Poultry cups	
8 Iron ticket boxes	
1 Stove and pipe in ladies' cottage	16 53
1 Shovel	
6 Lanterns	
1 Looking glass	
18 Padlocks	
1 3-inch water gate in Holden road	10 00
100 feet 2½-inch water log	12 00
4 Kerosene lamps	
9 Water tanks, 14x16 in. by 8 feet	
2 Water tanks, 14x16 in. by 14 feet	
2 Pump tanks, 2x2 feet by 4 feet	
1 Large kerosene oil can	
1 Small kerosene oil can	
1 Key to water gate	
1 Key to shafting	
1 Iron pulley for shafting	
1 Tin pail	
1 Clock	
1 Secretary's table (in Secretary's office)	35 00
2 Maps of grounds and 1 Woodcut of grounds, cost	66 70
90 Pcs. of mosquito bar	45 00
50 Flag staffs	
1 Jointer for track work	
150 feet ¾ rubber hose	18 00
2 Old cook stoves	18 00
10 Pine tables	
1 Old mower	25 00
1 Bed lounge	8 00
Herd books at Secretary's office	134 50
1 Iron plow	10 00
150 feet inch rope	
6 Brooms	
10 Flag poles	
4 Wooden pails	
20 Yds. cambric	
1 Pair shears	
6 Tack hammers	
4 Papers pins	
6 Towels	
6 Knives	
1 Carving knife, fork, and steel	
12 Tea spoons	
12 Plated forks	
1 Coffee pot	
12 Lamp posts	12 00

All of which is respectfully submitted.

J. M. STERLING,
A. O. HYDE,
F. M. MANNING,
Committee.

The report was referred to the Finance Committee, who submitted the following:

REPORT OF FINANCE COMMITTEE.

To the President and Executive Committee of the State Agricultural Society:

The undersigned, the Committee on Finance of said Society, to whom was referred the foregoing report of the Business Committee, beg leave to report that they have examined the foregoing records of accounts and transactions of the Business Committee of said Society, and have compared the vouchers in the hands of the Secretary, and find the record to agree and the account correct; and, in addition, that we have examined the report of said committee of the amount received for rent, for booths, peddlers' permits, and property sold on the Fair Ground, at the last annual Fair of said Society, and the names of the parties from whom received, and the amount thereof; and we further certify, that they have paid the same to the Treasurer and hold his receipt therefor, and for which he has rendered an account; and that we find the statements, vouchers, accounts, and receipts in all respects correct.

All of which is respectfully submitted.

HENRY FRALICK,
F. V. SMITH.
E. W. RISING,
Finance Committee.

DETROIT, January 13, 1880.

The President announced as the Committee on Premium List Messrs. A. F. Wood, Charles Kipp, I. H. Butterfield, H. O. Hanford, J. Q. A. Burrington.

The Secretary read a communication from H. A. Kipp, tendering his resignation as a member of the Executive Committee on account of injuries which rendered him physically unable to attend to his duties. The resignation was accepted.

Mr. Baxter moved the appointment of a Special Committee on filling vacancies in the Executive Committee. Carried, and Messrs. Fralick, Smith and Hyde were appointed such committee.

Mr. Baxter offered the following:

WHEREAS, At the annual Fairs of some of our sister States, there is an Educational Department, and premiums are offered and exhibits inserted from all Educational institutions of the State; and

WHEREAS, Such exhibits are calculated to elevate and improve the character and morals of the people, and to enlist the sympathy and coöperation of a large class of our citizens who might not otherwise be reached or interested in our Fairs; and

WHEREAS, At the recent meeting of the Michigan State Teachers' Association it was earnestly recommended that such a department be established by our Society, and that the Superintendent of Public Instruction, as representing the school interests of the State, the Presidents of the University, Agricultural College, and the Colleges of the State, as well as all our Public Schools, be invited to participate; therefore,

Resolved, That the matter of the establishment of such a department be referred to a special committee of three, of whom Ex-President William L. Webber shall be chairman, whose duty it shall be to consult with educational men, and if interest in the matter can be secured, that they be authorized to establish such department and offer appropriate premiums, and submit the same to the President and Business Committee, and if approved by them, that the same be printed in the Premium List.

The resolution was adopted.

On account of business engagements, which take him out of the city, Mr. Webber was excused from further attendance at this session.

Mr. Parsons tendered the members of the Executive Committee an invitation to meet the business men of Detroit at an informal social reception, at his house, on such evening during the session as would be most convenient.

On motion of Mr. Baxter, the invitation was accepted, with thanks, and Wednesday evening, the 14th inst., was fixed as the time for the reception.

The Committee then adjourned until 9 o'clock, Tuesday morning.

SECOND DAY.

MICHIGAN EXCHANGE,
DETROIT, January 13, 1880.

The Committee resumed its session this morning, President Phillips in the chair.

The roll was called and the following members answered to their names: Messrs. Sterling, Rising, Hanford, Ball, Cobb, Fralick, Hyde, Manning, Smith, Burrington, Wood, Butterfield, Parsons, Angel, Howard, Harrison, Gilbert, McKay, Shoemaker, Baxter, C. Kipp, and the President, Treasurer and Secretary.

The approval of the minutes was deferred.

REPORTS OF STANDING COMMITTEES.

To the President and Executive Committee of the State Agricultural Society:

The undersigned, Committee on Finance of said Society, to whom was referred the report of the Business Committee, beg leave to report that they have examined the foregoing record of accounts and transactions of the Business Committee of said Society, and have compared the vouchers in the hands of the Secretary and find the record to agree and the account correct; and in addition, that we have examined the report of said committee of the amount received for rent, for booths, peddlers' permits and property sold on the fair grounds at the last annual fair of said Society, and the names of the parties from whom received and the amount thereof; and we further certify that they have paid the same to the Treasurer and hold his receipts therefor and for which he has rendered an account; and that we find the statements, vouchers, accounts and receipts in all respects correct.

All of which is respectfully submitted.

HENRY FRALICK,
F. V. SMITH,
E. W. RISING,
Finance Committee.

The report was accepted and adopted.

REPORTS OF SPECIAL COMMITTEES.

To the President and Executive Committee of the State Agricultural Society:

The special committee to whom was referred the addresses and reports of the retiring and incoming Presidents, and a portion of the Secretary's report, for assignment of subjects to committees, would respectfully recommend as follows: So much of such addresses and report as refers to investment of a portion of the funds of the Society and a general financial policy, be referred to the Committee on Finance; so much as refers to bonds of Treasurer and Secretary, be referred to same committee, to recommend amounts for which such bonds shall be given; so much as refers to blanks for premiums awarded and space in halls for goods for advertising purposes, to Business Committee; so much as refers to equalization of premiums on different breeds of cattle, to Committee on Premium List; so much as refers to Pomological Society and invitations to exhibit with us, to a special committee of three, to consult with a like committee from said society; so much as refers to discretionary premiums, recommended at last fair, be referred to a special committee of three; so much as refers to the appointment of judges, previous to the time of the fair, and payment of their expenses, be referred to the Business Committee; so much as refers to northern exhibits and all other premiums recommended, to Committee on Premium List; so much as refers to rules and revisions of same, to Committee on Rules; so much as refers to the Agricultural College, to a special committee of three; so much as refers to open competition with the world, to Committee on Premium List.

Respectfully submitted,

W. J. BAXTER,
M. SHOEMAKER,
CHAS. KIPP,
Committee.

The report was accepted and adopted.

REPORTS OF EXECUTIVE SUPERINTENDENTS.

The report on cattle was presented by Mr. Phillips:

To the President and Executive Committee of the State Agricultural Society:

The last fair, so far as the exhibition of cattle, was very fine; rather better than Michigan has ever done before, as it was entirely Michigan stock. This rule has called out considerable criticism from the State press, and as almost all of them make the most talk about Canada being shut out, I would simply say, Canada did not show because if they ship their stock here the law of Canada prevents all stock from this side coming into their borders, so when once over here could not go home again. Therefore they had to stay away. I recommended this plan for reasons set forth in my report one year ago, and by the request of a number of our best breeders. I think the judging of cattle at our last fair, when it was confined to the scale of points, was the best I have ever seen done. Whenever the judges deviated from this rule their awards seemed to be like a boat without a rudder. I would therefore recommend that all classes of blooded cattle be judged by a carefully prepared scale of points to suit the breed. I herewith submit a scale for Jerseys, presented to the Society by Marcus W. Bates, breeder of Jerseys, Grand Rapids, Mich., and recommend its adoption by the Society for the coming fair. The show of Short-horns was excellent; Devons, but few entries, of excellent quality; Herefords, better than for several years; Ayrshires, just about an average with the last three years; Galloways, no improvement over former fairs; Jerseys, greatly on the increase in number and better quality than at any previous fair; Holsteins, largely on the increase. I feel it my duty as a cattle man to say to my brother breeders to invest carefully in this new breed, as I do not think them equal to the Devons, Herefords or Short-horns for Michigan. Perhaps this is saying what a superintendent ought not to say; if so I hope to be censured for it. In grade cattle the exhibition was grand, principally from Short-horn bulls and common cows. Working oxen and steers fully as good as last year. In fat cattle, I would recommend a departure from any rule we have been working, to simply fattening animals and carrying them along to get prizes on year after year. I think a better plan would be not to give a prize to an animal that had been fed more than one year. I also recommend that premiums be offered for animals one, two and three years old. This is the age that the markets demand and shows all the improvements. It also gives the breeder and feeder quick and profitable returns.

G. W. PHILLIPS,
Superintendent.

HORSES.

The report on Horses was presented by Mr. Hyde.

To the President and Executive Committee of the State Agricultural Society:

There were entered upon the Secretary's books 582 horses for exhibition at the last State Fair, as follows:

Class.			
12—Thoroughbreds			20
13—Horses of all work,	Stallions, all ages	42	
	Mares, all ages	27	
	Geldings, all ages	19	
	Matched Horses, all ages	6	
	Mules	1	
			95
14—Roadsters,	Stallions, all ages	64	
	Geldings, all ages	29	
	Mares and Fillies	85	
			178
15—Driving Horses,	6 pairs	12	
	Single Horses	41	
			53
16—Draught Stock,	Stallions, all ages	34	
	Mares, all ages	20	
			54

17—Carriage Horses, Double and Single, including those entered for Board of Trade Premiums	60
18—Special, Stallions, Old and Young	38
19—Special, Mares and Geldings, all ages	76
20—Stallions, with 6 Colts	8
Total entries	582

In this large number of horses there were no poor ones; all well bred and well cared for, embracing the larger breeds and roadsters in fair proportions, and a fair show of thoroughbreds.

There are many things appertaining to the Horse Exhibition to make it interesting, while it calls for constant care and watchfulness on the part of the Superintendents. There is a large and ceaseless pressure upon the Superintendents that does not exist to the same extent in any other department of the Society. It is all out of doors, and is very much embarrassed by stormy weather, especially upon such ground as we at present occupy. At our last Fair, we not only had mudholes upon the track, but immediately in front of the Judges' stand there was quite a pond of water, several inches deep, that the Judges had to wade through back and forth in the discharge of their duties. In this connection, the Superintendents beg leave to urge upon the management of the Society the necessity of doing any work that may be in contemplation for the improvement of the track sufficiently early, so that any material that may be used may become solidified to that extent that it will stand a rain much better than newly placed material of any description. With the very large number of entries in this department, there is great danger of not always giving each animal a fair chance for the exhibition of all its merits.

The Judges are of necessity constantly hurried in the discharge of their duties, and it is only by working early and late, rain or shine, that the work is got through with, and often not to the satisfaction of either exhibitors, Judges or Superintendents. In classes of Horses numbering from 20 to 178, all of good report, or very nearly equal in breeding and other desirable qualities, with but comparatively few premiums to be awarded, somebody's feelings are sure to be hurt, and somebody is going to be blamed. It may be the Judges or Superintendents, or the State Agricultural Society. No foresight or care can prevent this state of feeling. This has always been so, and undoubtedly will remain about so as long as Fairs exist. The Superintendents take this occasion to thank the gentlemen who acted for the Society as Judges at the late Fair, for their patient and careful labors, believing as we do that they were capable and honest, doing their work faithfully and well.

A. O. HYDE,
D. W. HOWARD,
Superintendents.

SWINE.

The report on Swine was presented by Mr. Wood.

To the President and Executive Committee of the State Agricultural Society:

In submitting a report in Division D, Swine, I can say the display as a whole, was a very creditable one for the State, the Berkshires taking the lead, being sixty pens; the Essex and Suffolks about equal in numbers, and a good show of each. In Poland China the entries were much less, but good specimens of the kind. We had two exhibitors of the so-called Chester Whites. I think, with the experience that our State has had with this class, it would hardly be worth the Society's encouragement of breeding them. I would recommend striking off the note following premiums on hogs, leaving any breed that might be named the privilege of calling for separate premiums, but would have it clearly stated just what is entitled to compete in every class.

AMOS F. WOOD,
Superintendent.

MISCELLANEOUS DEPARTMENT.

The report on Miscellaneous Department was presented by Mr. Childs.

To the President and Executive Committee of the State Agricultural Society:

The Superintendent of Division N, Class 66, Miscellaneous, would respectfully report that there was in this Division a larger and perhaps more varied and interesting display than we have ever before had in the history of the Society.

The amount of space in the Main Building, assigned to this Department, was well filled by articles, both useful and also interesting to visitors. There were also quite a large number of articles entered in this class, which from their character could not be exhibited in the building. These were displayed at different places upon the grounds, and being thus scattered caused great annoyance, not only to the Superintendent in charge, but also to the Awarding Committee in finding and properly examining and comparing the articles, and some were not found at all. We would recommend that for such articles in this Department as from their character cannot be displayed in the space set apart in the building, a particular locality be assigned upon the grounds and designated by appropriate signs, where such articles can all be collected and displayed together.

We would also recommend that in making up the premium list for the coming Fair the enumerated list in this department be increased by adding thereto as many as possible of such articles as are usually exhibited in this class, and the encouragement of the production and exhibition of which, by the offer of a premium, will subserve the best interest of the State.

All of which is respectfully submitted.

J. WEBSTER CHILDS,
Ex-Supt. Division N, Miscellaneous.

FARM IMPLEMENTS.

The report on Farm Implements was presented by Mr. Hanford.

To the President and Executive Committee of the State Agricultural Society:

GENTLEMEN,—The Superintendents in charge of Division H, Farm Implements, report that the exhibition in their department at the last State Fair was superior in each of the classes to any preceding Fair. The interest manifested by manufacturers not only of our own but of other States, has been gradually increasing from year to year, at least for the last ten years. New firms are being or are already organized in different parts of the State that exhibit farm implements, that come in strong competition and many times carry off the premiums from outside exhibitors, that a few years ago had no competition from any manufacturers here. Ten years ago many implements now in general use were not known, or if known were made entirely out of the State; now some of the best in use are made in the State and are exhibited at our State Fairs. This, in the opinion of the Superintendents, is one encouraging feature of the exhibitions. The facilities furnished by the Society for a good exhibition in this Division shows the foresight of the Chairman of the Business Committee, but we would recommend that the water pipe be so extended that the portable engines could each obtain water directly from the pipe. The large number of articles entered in this Division, as now enumerated, would seem to indicate that the premium list should be extended, and we therefore recommend that the premium list committee carefully enumerate the articles so that all worthy should have a premium offered in the list.

H. O. HANFORD,
ABEL ANGEL.

MANUFACTURES.

The report on Manufactures was presented by Mr. Smith.

To the President and Executive Committee of the State Agricultural Society:

The exhibition in this department was very full and very creditable. The addition to the hall of 100 feet, making in all 400 feet, furnished room—while it could hardly be called ample—yet furnished room with economical arrangement sufficient to give exhibitors very good opportunity to make their exhibits. While the hall was somewhat crowded, yet every exhibitor was accommodated and will undoubtedly be sufficient for the next Fair, if it should be held in this city. The exhibition was largely made up of exhibits from this city of such goods as were kept for sale, advertising being the principal inducement. The retiring President has anticipated the only recommendation of change that I had proposed to make: that room be provided for these exhibits but that no premiums be offered. This has been the practice with stoves for several years, and has given satisfaction to exhibitors. The manufacture of stoves is a great and growing business, especially in the city of Detroit, the goods finding an extensive sale not only in all parts of our own country but in foreign countries, thereby attesting their superiority, and has suffered no loss of interest at our exhibitions by the adoption of this policy.

F. V. SMITH,
Superintendent Department of Manufactured Goods.

MACHINERY DEPARTMENT.

The report on Machinery Department was presented by Mr. Manning.

To the President and Executive Committee of the State Agricultural Society:

In accordance with your request I herewith submit a brief report of the Machinery Department at our last annual Fair. As you are all well aware, I was not the Superintendent of this department, only filling that position from day to day, expecting to be relieved by Mr. Townsend North, who was originally appointed to fill that responsible position, therefore I did not observe as closely, or take such estimates as would enable me to make such a report as this very important department is entitled to and should receive. I am unable at this late day to give from memory the number of exhibits in said department, and the peculiar or special use of each article exhibited. I can, however, mention that G. S. Wormer & Sons occupied nearly one-fourth part of the space allotted to this department with their machinery of various kinds, each machine in perfect working order, kept running constantly during visiting hours, the wonder and admiration of thousands of visitors.

I must also mention the very interesting display made by Messrs. Pingree & Smith, of Detroit. This enterprising firm erected a very fine building near Agricultural Hall, in which was placed their machinery for manufacturing boots and shoes, where they had thirty-five men constantly employed in the manufacture thereof, and where a large number of interested visitors gathered daily, gaining new and enlarged ideas as to how we are shod. The viewing committee recommended discretionary premiums to both these firms, but the members of the executive committee, to whom all discretionary awards were referred, have decided that, in justice to the Society, they ought not to be allowed. The viewing committee also recommended medals and diplomas as follows: E. T. Barnum, Detroit, for best flue scraper and cleaner; Chandler & Taylor, Indianapolis, Ind., for best portable muley saw mill; H. A. Hand, Detroit, best hand fire engines; Henry McGraw, Detroit, best display oil cups; Detroit Lubricating Co., best lubricator; Morton's Check and Valve Co., Romeo, reversible check and pump valves; Gardener & Stephenson, Northville, machine for champering and lowering stone; C. Puddefoot, Detroit, best power press for sheet metal work, and beading and trimming machine. T. B. Rayl, Detroit, best display of machinist tools; same, wood carving tools; same, scroll work; Jos. Wenkleman, Detroit, best display of edge tools; C. I. Whitmore, Adrian, best display of axes and scythes; Detroit Emery Wheel Co., Detroit, best display of emery wheels; D. E. Rice, Detroit, patent pump and heater, patent centering and squaring tools, and hot water reservoir; Jas. Flower & Bro., model of fire hydrant and brass goods for steam, water, or gas fixtures, and iron pipe fittings for steam, water, or gas; Wm. Vahey, Forest, Ontario, horse collar blocking machine; W. S. Penfield, Detroit, ice cutting tools; John Webster, Detroit, bran cleaner, meal cooler, and agitator; A. A. Tierney, Detroit, Bailey & Co.'s patent Tuyere iron; E. R. Davis, Detroit, slate cutter and punching machine; H. M. Perrin, Detroit, self oiler compound lamp, display of oil cans, oils and oils in compound; C. B. James, Detroit, display of copper tea kettles; Cornwells, Price & Co., Peerless paper cutter; Mead & Co., Detroit, grinding mill; F. Zabriske, Detroit, display of seals, stencils, steel, and rubber stamps; J. W. & M. M. Wharf, Detroit, window sash holder and fixtures; J. H. Lewis, Detroit, model of reaper rake; Gardner & Stephenson, Detroit, hoops on barrels; Jno. J. Ryan, Midland, Mich., pair of log tongs; J. W. Penfield, Willoughby, Ohio, brick and tile machine combined; Kidder Slide Door Hanger Co., Romeo, Mich., pair of door hangers; S. T. Olney, Detroit, saw, file, and grainer; S. T. Shaw, Detroit, adjustable hanger; Fulton Iron Works, Detroit, machinist's vice and anvil combined, two tire re-setters, wagon tire bender; J. L. Bryant, Hillsdale, bit steel press drill, and Kennedy & Greig, Detroit, steam power elevator. But the executive committee heretofore mentioned have, after careful consideration, decided to make but few awards on said articles. For further information in relation to discretionary premiums you are referred to the report of said committee. The hall was well filled, yet each exhibitor had all the room required. This department is one of great importance to our Fair and the State at large, and should be encouraged to as great an extent as possible by our Society.

Respectfully submitted.

F. M. MANNING,
Assistant Superintendent.

The report on transportation was presented verbally by Mr. Sterling.

The various reports were referred to the Committee on Premium List.

COMMITTEES ANNOUNCED.

The President announced the following committees:

Committee to meet with a committee on part of Pomological Society—Messrs. Henry Fralick, F. V. Smith, A. J. Dean.

Committee on Discretionary Premiums.—Messrs. W. J. Baxter, J. M. Sterling, H. O. Hanford.

Committee on Agricultural College.—Messrs. M. Shoemaker, William Ball, Charles Kipp.

Committee on Rules.—Messrs. Wm. Ball, A. O. Hyde, C. A. Harrison.

The President added Mr. Howard to Committee on Premium List.

THE NEXT STATE FAIR.

On motion of Mr. Baxter the matter of the location of the next State Fair was referred to the Business Committee, to be hereafter appointed.

On motion of Mr. Gilbert the Business Committee was instructed to advertise for proposals from cities desiring to have the next State Fair, stating the inducements which they present.

On motion of Mr. Baxter the time for holding the next State Fair was fixed for September 13, 14, 15, 16 and 17, 1880.

The Finance Committee reported, approving the report of the Treasurer, and the same was adopted.

The committee then took a recess until 2 P. M.

Afternoon Session.

The committee reassembled pursuant to adjournment. The following report of a special committee was presented:

To the President and Executive Committee of the State Agricultural Society:

The committee to whom was referred the subject of filling vacancies in the Executive Committee, respectfully report that we find the following vacancies to exist: by resignation of H. A. Kipp, Highland, Oakland county; D. A. Blodgett, Hersey, Osceola county, and recommend that hereafter all appointments to fill vacancies in the Executive Committee be made by ballot.

All of which is respectfully submitted.

HENRY FRALICK,
F. V. SMITH,
A. O. HYDE,
Committee.

The report was accepted and adopted.

On motion of Mr. Shoemaker the election of members to fill the vacancies in the committee as above specified was made the special order for the first business of the session this evening.

On motion of Mr. Gilbert, gentlemen not members of the committee present from the counties in which occur the vacancies created by the above resignations were invited to be present at the time fixed for filling the vacancies and present any considerations they may desire upon the subject.

Mr. Baxter offered the following:

WHEREAS, Complaints are sometimes made and impressions created injurious to the Society by competition for premiums by members of the Executive Committee, such competition being liable to the objection that, as against such competitors, others labor under serious disadvantages. And it being the earnest and determined purpose of all the members of this committee, at whatever sacrifice of personal interest, to remove all possible ground of complaint or even suspicion of improper influence upon the decision of judges in awarding premiums; therefore

Resolved, That while all the members of this committee and the executive officers of the Society are earnestly invited and expected to make as large and as interesting exhibits as possible at the annual fairs, no member of this committee or officer of the Society shall be allowed, directly or indirectly, to compete for premiums offered by the Society at any of its fairs.

On motion of Mr. Baxter the resolution was laid on the table.

Mr. Dewey, Superintendent of the Poultry Department, presented the claim of Hayes & McElvaine, of Hastings, Mich., for $10 for two pairs of valuable bantams, stolen from the fair ground during the progress of the last annual fair.

Mr. Ball moved that the claim be allowed. Lost.

Mr. Cobb moved the appointment of three delegates to represent the State Agricultural Society at the convention of the county agricultural societies, which meets at Ann Arbor on the 20th inst.

Mr. Gilbert moved as an amendment that the President be one of the delegates, he appointing the other two, and the Society paying the expenses of the delegates.

Mr. Cobb accepted the amendment and the motion prevailed. The President named as the two delegates to be associated with himself Messrs. Cobb and Butterfield.

Mr. C. W. Garfield, Secretary of the State Pomological Society, filed his report of the exhibit of fruits and flowers at the last State Fair. The report was accepted.

At his request Mr. Hanford was relieved from serving on the committee on the awarding of discretionary premiums, and Mr. Fralick was elected to fill the vacancy.

The committee then took a recess until 7:30 P. M.

Evening Session.

The Executive Committee resumed business at 7:30 P. M., the President in the chair.

The roll was called by the Secretary and the following members answered to their names:

Messrs. Sterling, Rising, Hanford, Ball, Cobb, Fralick, Hyde, Manning, Smith, Burrington, Wood, Parsons, Angel, Howard, Harrison, Gilbert, McKay, Shoemaker, Baxter, C. Kipp, and the President, Treasurer and Secretary.

On motion of Mr. Baxter his resolution of the afternoon, prohibiting members of the Executive Committee from competing for premiums at the annual fairs of the Society, was taken from the table.

After some discussion by Messrs. Baxter, Ball, Shoemaker, Smith, and Parsons, leave was granted the mover to withdraw the resolution.

On motion of Mr. Baxter the committee then proceeded to the election by ballot of a member of the Executive Committee to fill the vacancy caused by the resignation of Mr. H. A. Kipp.

The President appointed as tellers Messrs. Ball and Parsons.

An informal ballot was taken with the following result:

Chauncey W. Greene, of Oakland	8
A. S. Brooks, of Oakland	8
John Leonard, of Oakland	1
D. T. Dewey, of Shiawassee	1

A formal ballot was then taken, resulting in 13 votes for Mr. Greene and three scattering. The election of Mr. Greene was made unanimous.

The committee then proceeded to the election of a member to fill the vacancy caused by the resignation of D. A. Blodgett, of Osceola county. An informal ballott resulted as follows:

Wm. Chamberlain, of Berrien	12
D. T. Dewey, of Shiawassee	4
Warner A. Baldwin, of Berrien	2
Isaac Marston, of Bay	1

A formal ballot was taken, giving Mr. Chamberlain 12 and 3 each for Messrs. Dewey, Baldwin and Marston. The election of Mr. Chamberlain was made unanimous.

REPORTS OF EXECUTIVE SUPERINTENDENTS.

The next business in order being the reports of Executive Superintendents, that upon sheep was presented by J. Q. A. Burrington, as follows:

To the President and Executive Committee of the State Agricultural Society:

The Superintendent of Division C would respectfully submit the following report:

At the last fair of your Society there were 303 entries in this division, the whole number of sheep being 793, a larger number, I think, than at any preceding fair. In quality, also, I think there was a marked improvement. The leading breeds were all well represented. At the outset the ingenuity of the superintendent was taxed to the utmost to arrange this large number in the one hundred and eighty pens provided by the Society for their accommodation, in a manner that would be satisfactory to the exhibitors. Through the courtesy of the Superintendent of the Swine Department we procured a few pens in his division, and by doubling the number in many of the pens we finally succeeded in getting all under shelter. This arrangement, though not entirely satisfactory, was acquiesced in as the best that could be made under the circumstances.

The sheep interest of Michigan at the present time is one of great magnitude, and rapidly growing in importance. The wool crop of the State is exceeded in value, I believe, by wheat alone. The prospective increase in the price of wool for the coming year cannot fail to give a marked impetus to this great interest. I believe it to be a wise policy on the part of this Society to offer a liberal encouragement to this division.

The total amount of premiums offered in this department was $1,201; the amount awarded was $1,182.

I would recommend that all the different breeds be placed on an equal footing in our premium list as to the amount of premiums offered.

I am under great obligations to the Awarding Committees for the very efficient and satisfactory manner in which they discharged their duties.

J. Q. A. BURRINGTON,
Superintendent.

MUSIC, ETC.

The report on Music, etc., was presented by Mr. Cobb.

To the President and Executive Committee of the State Agricultural Society:

The Superintendent of the Department of Music would make the following report:

The space set apart for this Department was ample, and at the same time all the space was occupied. The exhibition was large and very fine. The exhibit of Jewelry was said to be the finest ever seen in the State, consisting of over $100,000. The exhibit of Musical Instruments was very large and full of interest to those attending the Fair. The exhibit in Sewing Machines was full; every kind and style being on exhibition that is now being offered to the public. There was a large number of articles on exhibition in this Department that added very much to the Show, which it is impossible to enumerate.

Your Superintendent is of the opinion that the exhibitors were well satisfied with the space allotted them, also with the premiums awarded.

All of which is respectfully submitted.

W. H. COBB,
Superintendent.

VEHICLES.

The report on the Department of Vehicles was presented by Mr. Ball.

To the President and Executive Committee of the State Agricultural Society:

In making the required report in Division I, I would say that all, or nearly all of the articles shown were of style, finish and quality quite superior, while some were very excellent indeed.

The whole number of premiums awarded were 50. First premiums, 19; 2d premiums, 15; discretionary premiums, 16. Whole number of entries, 76; though many entries represented two or more vehicles, making the number of articles shown much larger than the entries. The accommodations were quite ample, I think, for all exhibitors, unless it might be those who wished to make them a means of accommodation for selling their wares. I think that the committee who had the awards to make did their duty faithfully and well, although they complained of too much bulldozing on the part of some exhibitors.

All of which is repectfully submitted.

WILLIAM BALL,
Superintendent.

FINE ARTS.

The report on the Department of Fine Arts was presented by Mr. Parsons.

To the President and Executive Committee of the State Agricultural Society:

Your Superintendent of Fine Arts would respectfully report that there was manifested during the Fair of 1879, an unusual interest in all that related to this department, the additional space granted being entirely utilized by exhibitors. The paintings shown gave conclusive evidence of a growing interest and improvement in this, the most important feature of the Fine Art Department. There seems growing up in our city and State a more cultivated taste and thorough appreciation of Art for itself and for its influence over others. This encourages our artists to more earnest efforts and higher aims. There is a difference of opinion among our artists as to the wisdom or desirability of an award of premiums. At all events, there is a general sentiment among them that if premiums are offered they should, to some extent, be commensurate with the interest sought to be encouraged. For instance, for illustration, you offer as first premium on an American Merino Ram, ineligible to registry, $15; for a second premium, $10; for a third, $5; fourth $3; while for a picture worth $15,000, the first premium is $2; the second, $1. In case of fire or panic, the property first mentioned can be drawn from the ground without risk, while in the other case a fire risk of $16,000 on two pictures was required to secure an exhibit. Had Stanley been living, he would hardly feel flattered with the premium on his great picture of the Trial of Red Jacket, so full of expression and rich in coloring, attracting universal attention. The great point should be to bring out the best effort of our artists. To do this there should be a more discriminating increase in premiums in certain classes or an abolition of all premiums. This feature of our Exhibition is one of the most attractive and should be wisely fostered and encouraged. The show of stationery and book-binding, books and printing, were of the first order, and reflected great credit on those making the exhibit. The exhibition of articles of ladies' dress, plain needle and machine work, embroidery and ornamental needle work, crotchet, knit and fancy work, hair and shell work, were the best ever shown, in the opinion of capable judges.

Respectfully submitted.

P. PARSONS,
Superintendent.

FORAGE.

The report on Forage was presented by Mr. Rising.

To the President and Executive Committee of the State Agricultural Society:

The Superintendent of Forage begs leave to make the following report and suggestions: Owing to the large expenses incurred by the Society, I would recommend that there be a shed or barn built on the Fair Ground sufficient to hold the Forage for the Fair, so the Superintendent in charge could get his supplies on hand before the Fair opens, and save the annoyance when the rush of business begins. I would also suggest that this Society establish the amount of forage that each exhibitor is entitled to draw, according to the class of stock he has on exhibition, so that the Superintendent can deliver, or the party can come and draw the amount they are entitled to, on their certificate of entry. As it is now, it is very annoying, both to the Superintendent and exhibitor. It is impossible to do justice to exhibitors—some get more than they ought, while others perhaps do not get what belongs to them; it is impossible for the Superintendent to find out who needs and who does not, for some stock are locked up from morning till night, and he cannot tell whether they have or not, till they find fault that they are out, then perhaps it is too late to reach them in time to supply them. Then somebody is blamed, perhaps justly, but when you place a Superintendent in position so that six or seven of the largest class of exhibitors find fault, then you must expect to hear some noise; but I think the whole matter can be so arranged as to give better satisfaction.

All of which is respectfully submitted.

E. W. RISING.

Accepted and referred to the business committee.

REPORTS OF EXECUTIVE SUPERINTENDENTS.

The report of the agricultural department, written by Judge Marston, was read by the Secretary.

To the President and Executive Committee of the State Agricultural Society:

In compliance with Sec. 8, Art. 2, of the General Rules and Regulations of your Society, I hereby present my report upon the exhibitions in agricultural hall at the late State Fair.

On taking charge of this hall, I had but little if any experience in such matters, yet so kindly was I treated by the several officers of your Society, and my every suggestion in reference to fitting up the hall was so promptly adopted and carried out, that I soon felt at home, and undertook my work with confidence.

At the outset, I thought that if the various articles entered could be properly arranged in order, each of its kind together, the appearance would be much improved thereby, visitors would appreciate the arrangement, and the several awarding committees be better enabled to examine the articles, compare them, and with dispatch make their award. This of course could not well be done where entries of "collections" had been made. In such cases, and so far as practicable, each collection was placed by itself, and a section of the hall was assigned for collections.

Some of the exhibitors at first objected to this arrangement, yet I think all were satisfied that no injustice was done them thereby.

VEGETABLES.

Although the season in some parts of the State, notably so in the Saginaw valley, was unusually dry, thus materially affecting vegetable growth, yet the display made was very creditable. Messrs. Everding and Engle of Detroit, Prescott of Grand Rapids, Chipman of Reading, Wurtz and Geddes of Saginaw, placed on exhibition a variety of very fine vegetables, the collections of the Messrs. Wurtz and Geddes being very large.

As showing more particularly the size of some of the vegetables exhibited, I had some weighed, and herewith give the weight of some, with the name and residence, where known, of the grower.

MELONS AND CITRONS.

E. H. Wurtz, Saginaw	1	watermelon	30	lbs
" "	2	"	34	"
G. W. Prescott, Grand Rapids	1	"	26	"
" "	2	"	44	"
" "	1	citron	27	"
David Geddes, Saginaw	1	"	25½	"
Wurtz, "	1	"	16½	"

SQUASH.

Geddes	1 Butman's squash	25	lbs.
“	1 American “	18½	“
“	1 Marblehead “	34	“
“	1 Golden Mammoth squash	26	“
“	1 Crook Neck “	13	“
“	2 Summer Scallops “	19½	“
Martt	1 Squash	102	“
“	1 Hubbard squash	17	“
H. C. Engle, Detroit	1 “ “	29	“
“ “	2 Summer Scallops squash	16	“
“ “	1 “ “ “	93	“
Chipman, Reading	1 Squash	71	“

CABBAGE.

Van Heften, Kalamazoo	1 Drumhead	16½	lbs.
“ “	1 Red	13	“
“ “	1 Mammoth	20	“
“ “	1 Wurningstadt	10	“
Engle, Detroit	1 Drumhead	22½	“
O. P. Abell, Wayne	1 Early	17	“

BEETS AND MANGEL WURTZEL.

Wurtz	1 Red Mangel Wurtzel	18	lbs.
“	1 “ “	16½	“
“	1 Sugar Beet	17½	“
Geddes	1 “	12	“
“	1 Mangel Wurtzel	15	“
“	1 “	14	“
Abell	1 Beet	13	“

POTATOES.

Van Heften	6 Potatoes	5½	lbs.
Walters, Utica	1 Peck	15½	“
Geddes	6 Early Rose	8	“
“	6 Brownell's Beanties	5¾	“
“	6 Victor	7	“
“	6 Ruby	6	“

ONIONS, ETC.

Van Heften	3 Yellow Danvers	2½	lbs.
“	3 White Globe	2	“
“	3 Red Wethersfield	2½	“
“	1 Dozen Celery	8	“
Geddes	3 Giant Rocha Onions	4½	“
“	1 Winter Radish	10	“
“	1 “ “	11	“
Wurtz	1 “ “	9	“
Everding	½ Bush. Tomatoes	39	“
“	1 Vegetable Egg	6	“

If the practice of weighing each year could be continued, and a record thereof kept, it would in time prove valuable, and be a means of ascertaining what progress was being made in the growth of vegetables. For the prizes taken by these gentlemen and others in the class to which the above articles belonged, I must refer you to the Secretary's report.

GRAIN.

There were not so many entries in this class as I should have been pleased to see. Evidently, and for some reason, the people do not take the interest in this class which the importance thereof would seem to demand.

The Awarding Committee, at my request, weighed the wheat, and I here give the weight per bushel, and name and residence of the grower:

WHITE WINTER WHEAT.

Daniel Woodman, Paw Paw, Van Buren Co.	61½ lbs.
Wm. F. Kelly, Pontiac, Oakland Co.	59½ lbs.
R. M. Webster, Armada, Macomb Co.	64 lbs.
G. W. Prescott, Grand Rapids, Kent Co.	61 lbs.
James M. Hill, Ann Arbor, Washtenaw Co.	61 lbs.
James Smith, Greenfield, Wayne Co.	61½ lbs.
C. P. Reynolds, Harrisville, Alcona County	61 lbs.
Charles Lerker, Greenfield, Wayne Co.	59½ lbs.

RED WINTER WHEAT.

R. M. Webster, Armada, Macomb Co.	63½ lbs.
G. W. Prescott, Grand Rapids, Kent Co.	61½ lbs.
Wm. Hall, Greenfield, Wayne Co.	61 lbs.
H. E. Bidwell, Plymouth, Wayne Co.	64 lbs.
H. D. Platt, Ypsilanti, Washtenaw Co.	65 lbs.
A. B. Travis, Brandin, Oakland Co.	63 lbs.

SPRING WHEAT.

C. P. Reynolds, Harrisville, Alcona Co.	65 lbs.
E. R. Wurtz, East Saginaw, Saginaw Co.	64½ lbs.
O. Geddes, East Saginaw, Saginaw Co.	65½ lbs.

The variety of wheat thus weighed, I regret to say, I am unable to give. Owing to some misunderstanding, no record was made of the weight of other grains.

BOARD OF TRADE PREMIUMS.

The liberal premiums offered by the Detroit Board of Trade for the best and second best two bushels of wheat and other grains, caused considerable competition from different parts of the State. Had these premiums been offered at an earlier day, and thus more time given to thoroughly advertise the same, I cannot doubt but that a very much larger number of entries would have been made.

The Board of Trade appointed a committee of its own members, Messrs. Alex. Lewis, R. W. Gillett and E. K. Norton to examine the grain and make the awards. The following is the result:

WHITE WHEAT.

Charles Supe, Bay City, Bay county	First premium
G. G. Stewart, Clay township, St. Clair county	Second premium

RED WHEAT.

Irving Webster, North Branch, Lapeer county	First premium
H. B. Hoagland, Flint, Genesee county	Second premium

J. Clark & Son, Hunter's Creek, Lapeer county, exhibited a bag of Treadwell which the committee pronounced very fine, and expressed regrets that under the offer made they were unable to give these gentlemen a premium thereon.

BARLEY.

David Woodman, Paw Paw, Van Buren county	First premium
E. E. Duncan & Co., Detroit, Wayne county	Second premium

OATS.

E. H. Wurtz, East Saginaw, Saginaw county	First premium
F. M. Mauk, Highland Station, Oakland county	Second premium

CLOVER SEED.

W. A. Conner, Wasepi, St. Joseph county	First premium
L. P. Lawrence, L. P. Ronde, Cass county	Second premium

I desire to call your attention more directly to the above awards. The premiums offered were liberal and caused active competition. Considering the character and fitness of the gentlemen composing the committee, all will cheerfully concur in their judgment, and accept it as unquestionably correct.

It will be noticed that in wheat, the staple crop, both white and red, the central counties generally, and better known as the northern counties, carried off all the premiums—Bay, Lapeer, St. Clair and Genesee—all north of the line of the Detroit, Grand Haven and Milwaukee Railroad.

The central or northern part of the State has in the last few years gained a very enviable reputation as wheat producers, owing to the uniformly large yield per acre. This last test demonstrates the excellent quality of the grain. What cause may be assigned for this I know not, but I state the facts, and for the present am satisfied therewith.

WORTHY OF SPECIAL MENTION.

Mr. David Woodman, of Paw Paw, exhibited, arranged in excellent and attractive order, a very large collection of grains in the straw, with stalk and roots entire, also in heads, in the berry, and some manufactured into flour. He had twelve different varieties of wheat, six of rye, nine of oats, twenty-one of corn, six of beans, seven of grasses, besides flax, pampas, rice, amber, sugar cane and chestnuts in the burr.

The collection, preparation and arrangement of these grains and grasses must have occupied considerable time. Mr. Woodman, from the experience gained by him in the growth of the various varieties, should be able to impart some very valuable information as to the growth and yield thereof. The premiums offered and awarded him for such a collection would not be a sufficient compensation for the time spent in collecting and exhibiting them. I respectfully suggest whether your board would not take some further action in reference to this matter, and whether, in connection therewith, Mr. Woodman might not be requested to state some facts in connection with the yield and probable profit of a more general cultivation of some of the varieties exhibited.

W. L. Walters, of Utica, exhibited seventy-eight different varieties of potatoes, carefully arranged in separate boxes and named, many of them raised by him from the seed and therefore new varieties. At my request he prepared a statement, setting forth the character of the soil upon which they were grown, the fertilizers used, the date of planting, a list of the varieties, the yield per acre and date of ripening. The information thus given I consider of sufficient value as to be well worthy of preservation, and I attach his report therefore hereto and make it a part hereof.

In my opinion, the man who thus devotes his time to the propagation of new varieties of a vegetable, so important and of such universal use as the potato, and which so soon deteriorates both in yield and quality, is doing the people of the State a service difficult to be properly estimated. To encourage such men in their work is, I think, one of the objects contemplated in the organization of agricultural societies. Their failures must be many and disheartening, yet occasionally they give us new variety which adds to the wealth of the individual, of the State, and of the nation. I would especially commend Mr. Walters to your favorable consideration.

The Messrs. Penfield, of Detroit, made a very fine display of grain and grass seeds, but owing to reasons hereafter stated they were unable to compete for premiums thereon.

WHO ARE ENTITLED TO COMPETE FOR PREMIUMS.

I soon noticed that members of the Society had in entire good faith, entered for premiums, grain, seeds, and vegetables not of their own growing. I made inquiry of those supposed to be familiar with the rules relating thereto, and ascertained that such was in accordance with the prevailing custom. Having doubts as to the correctness or desirability of such a custom, I made careful examination of the constitution and rules of the Society and determined therefrom, that while they had a clear right to exhibit, they could not compete for premiums, and ruled accordingly. I called the attention of the gentlemen interested to the rules and my construction thereof, and they acquiesced therein.

The provisions relied upon by me to sustain this ruling were the proviso to Article 7 of the Constitution, and Rule 11, Article 7, relating to premiums, contains this proviso: "That before any premium shall be delivered, the person claiming the same, or to whom the same shall be awarded, shall deliver to the Recording Secretary of the Society, in writing, an accurate statement and description, verified in such manner as the Executive Committee may direct, of the character of the soil, and the process in preparing it, including the quantity and quality of the manure applied in raising the crop, or the kind and quality of food in feeding the animal as the case may be; also the kind and cost of labor employed, and the total expenses and total productions of the crop, or the increase of value of the animal, with a view of showing accurately the exact resulting profit." This clearly contemplates that the grower of the grain, seeds, and vegetables shall be the exhibitor, as it would be very difficult indeed, if at all possible, for any other to furnish the information here required. True, this information is not required until the premium is claimed. But if a premium is awarded to a person not a grower, and who therefore cannot give the desired information on claiming his premium, the premium is forfeited to the Society, and the person who otherwise would have been awarded the same is deprived thereof. To properly and effectually meet the difficulty therefore, such parties must not be permitted to compete for premiums. It is the producer, and not the purchaser, that is entitled to the encouragement and honor which a premium is supposed to give.

I would also call attention to the fact that the premiums offered by the Board of Trade were thrown open to all, and not restricted or limited to the grower of the grain exhibited. This enabled commission merchants from different parts of the State to select from grain purchased by them, and enter such selected grain in competition for premiums. The Detroit Board of Trade offered the premiums and did not even restrict its own members from competing. This their members did not, and of course would not do. Yet they had a right to. It seemed to me that one of the chief objects in view in offering the premiums was to encourage the growth of grain of superior quality, and to permit commission merchants and dealers to compete has but slight tendency in the direction sought. It would seem to be but necessary to call attention to these matters to insure a prompt correction thereof. You may deem it necessary to amend Article 7, or place such an official construction thereon as will remove any existing doubt upon these questions.

All of which is respectfully submitted.

ISAAC MARSTON,
Superintendent pro tem. Agricultural Hall.

BAY CITY, December, 1879.

The following is Mr. Walters' report, referred to by Mr. Marston:

This collection of potatoes was raised on one-quarter of an acre. Soil, black sandy loam; had been cultivated forty-five years; were planted in hills 3½ feet apart each way. Fertilizer used: 10 bushels coal ashes, 50 lbs. salt, 50 lbs. plaster, 4 loads stable manure. All planted and cultivated alike, and each variety carefully weighed when dry. All planted May 7.

	Yield per Acre.	Date of Ripening.
Alpha	66⅔	--------
Brownell's Superior	183⅓	Sept. 10
Briss Triumph	66⅔	Aug. 16
Buchan's Favorite (new)	600	Sept. 10
Brownell's Beauty	233⅓	Aug. 27
Buckeye	83⅓	20
Bingham's Seedling	133⅓	Sept. 1
Blush	116	Aug. 16
Beauty Hebroy	350	23
Burbank Seedling	333⅓	Sept. 10
Cottage Seedling	223	Aug. 27
Compton's Surprise	200	Sept. 23
Connecticut Blue	166½	10
Carpenter's Seedling	400	Aug. 23
Cow Horn	200	27
DeWitt Prolific	166¾	27
Damar's Seedling	300	Sept. 10
Davidson's Seedling	166	Aug. 16
Early Mexican	133	27
Eureka	283¾	18
Early Vermont	233⅓	8
Early Paragon	50	16
Early Ohio	100	16
Early Rose	233⅓	16
English Fluke	66⅔	27
Early Shaw	116	23
Early Peach	66	23
Early Mountain	116	27
Genesee County	166½	23
Garrison's Seedling	166⅔	27
Garrison's Russet	166⅓	Sept. 2
Humboldt	33⅓	Aug. 9
Hemlock	66	Sept. 2
Hard Head	133⅓	Aug. 23

	Yield per Acre.	Date of Ripening.
Improved Peachblow	133⅓	23
Irish Orange	133	27
Jersey Peachblow	100	18
Jersey White	200	Sept. 1
Jersey Flake	116⅔	Aug. 27
Johnnie Bull	200	Aug. 26
Kalamazoo	83	Sept. 4
Lady Finger	133⅓	1
Late Rose	200	Aug. 27
Land's Prolific	333⅔	23
Long Pink Eye	66½	Sept. 5
Long Red Eye	33	Aug. 27
Long Pink	233⅓	16
Little Giant	133⅓	18
Long Purple	66	Sept. 2
Michigan Prolific	366⅔	Aug. 23
Mercer Seedling	133⅓	25
May Hope Seedling	100	27
Mountain Pearl	333⅓	27
Macomb County	66⅔	23
McGlinn's Seedling	116	23
Mike's Favorite	83⅓	23
Ohio Victor	133¼	16
Peerless	433	Sept. 1
Queen Victoria	383⅓	10
Red Lyon	166⅔	Aug. 23
Red Peachblow	-----	--------
Red Strawberry	66	Aug. 27
Red California	333	--------
Snow Flake	233⅓	Aug. 23
Shakers' Russett	250	27
Shelby	66⅓	23
Seedlings, Lady Finger	50	16
Trophy	233	Sept. 10
Tioga	270	Aug. 27
Utica	166⅔	16
White Strawberry	66¾	16
White Merino	133⅓	27
White Rock	33	23
White Rose	66⅔	23
White Peachblow	66⅔	Sept. 10
White Queen	700	10
Winslow's Centennial	200	Aug. 23
White California	400	--------

Mr. Marston—The above is a true copy of my report of potatoes at State Fair of 1879.

W. L. WALTERS,
Utica, Macomb Co., Mich.

September 22, 1879.

POULTRY.

The report of the Poultry Department was presented by T. D. Dewey.

To the President and Executive Committee of the State Agricultural Society:

The Superintendent of Division E., Class 31, Poultry, of your last Fair, would respectfully submit the following report:

Class.	No. of Entries.	Amount Offered.	Awarded.
Asiatic	81	$36 00	$38 00
Dorking	7	18 00	12 00
Game	39	24 00	39 00
American	11	6 00	6 00
Polish	19	24 00	18 00

Class.	No. of Entries.	Amount Offered.	Awarded.
Spanish	48	$18 00	$16 00
French	6	18 00	5 00
Hamburg	31	24 00	22 00
Bantam	51	36 00	33 00
Turkey	8	24 00	9 00
Ornamental	1	9 00	2 00
Goose	15	15 00	11 00
Duck	33	18 00	19 00
Rabbit	17	12 00	17 00
Pigeon	17	8 00	8 00
Cage Birds	4	12 00	7 00
Mary's Pet	10	12 00	6 00
Stuffed Bird	2	15 00	15 00
Miscellaneous	5	6 00	9 00
Most varied and valuable	4	25 00	25 00
	409	$360 00	$317 00
Deducting discretionary premiums recommended			11 00
			$306 00

Discretionary premiums recommended as follows:

SPANISH CLASS.

No. 391	$1 00
" 418½	1 00

HAMBURG CLASS.

No. 568	1 00

NEW UNENROLLED, OR MISCELLANEOUS.

No. 90	1 00
" 250	1 00
" 267	1 00
" 268	1 00
" 352	1 00
" 1181	1 00
" 1508	1 00
" 1580	1 00
	$11 00

I recommend the following additions to the premium list:

ASIATIC CLASS.

Pea Comb, Partridge Cochin.

GAME CLASS.

Yellow Duckwing, Silver Duckwing, Red Pyle, White Pyle, Brown Breasted Red, Ginger Red, White Game, Black Game, Irish Gray, Blue Game, Malays.

HAMBURG CLASS.

Golden Pencil Hamburgs, Silver Pencil Hamburgs, Black Hamburgs.

MISCELLANEOUS CLASS.

Long Shows, Rumpless, Black Javas, Russians, Suttons and American Sebrights.

BANTAM CLASS.

Yellow Duckwing, Silver Duckwing, Red Pyle, White Pyle, White Breasted Bantams, White Rose Comb, Black Rose Comb, Japanese Bantams, Pekin Bantams.

GOOSE CLASS.

African Geese.

DUCK CLASS.

White Muscovey Duck, Colored Muscovey Duck.

To strike out from the premium list:

ASIATIC CLASS.

Duckwing Games, White Legged Early Derby.

HAMBURG CLASS.

Brown Hamburgs.

BANTAM CLASS.

Duckwing Bantam.

GOOSE CLASS.

Dark Chinese Geese.

DUCK CLASS.

Musk or Muscovey Ducks.

I refer you to the National Poultry List herewith submitted, which I understand to be the standard list.

Complaint is made that the Poultry House is low and dark. I therefore recommend the putting in of sky-lights.

I hereby recommend the payment of all premiums awarded by the Judge, Mr. W. H. Todd, as per Mr. Todd's letter herewith submitted.

T. D. DEWEY.

Vermillion, Erie County, O., October 25, 1879.

DEAR SIR,—Some of the breeders who showed at Detroit have written me that I did not sign the Judges' Book. It was an oversight that I did not. I will authorize Mr. Dewey to sign it for me. I will recommend the payment of all premiums on all breeds where I made awards. I think this should be done for the reason that the premiums were small, and, unless we give this encouragement breeders will be likely to stay at home in future. I have not the initials of Mr. Dewey by me, or I would write him. You can speak to him about it, and say if the lack of my signature to the book makes any difference, it was an oversight, and I will now authorize any officer of the society to sign it.

Yours truly, W. H. TODD.

DAIRY DEPARTMENT.

The report on Dairy Department was presented by Charles Kipp.

To the President and Executive Committee of the State Agricultural Society:

In accordance with a rule of the Society, I herewith submit my report of the Dairy Department at the last annual Fair.

Owing to increased facilities afforded by the Society in providing ample room, the exhibition in this department was unusually large and attractive in nearly every class, the entire space being filled and displayed in a creditable and attractive manner.

The exhibit in butter was very large and of the finest quality, so much so that the viewing committee were at a great loss to determine where to place the ribbons, and expressed to me that it was the most difficult thing they had ever undertaken.

The exhibit of cheese was equally large and fine in quality, demonstrating the fact that our State is taking front rank in these two great staples.

The exhibit in 37 was not so large as it ought to have been, and I think this may be attributable quite largely to the fact that heretofore the Society has been unable to furnish the necessary space for the display of such articles as properly come under this class.

In class 38 the exhibit was the largest and most attractive of any previous Fair, and should always receive the necessary encouragement from the Society.

In Apiary, the exhibit was very creditable and attractive, but I am of the opinion that this should be a separate and distinct department, as most all exhibitors are desirous of showing colonies of bees with their other exhibits, and it is utterly impossible to have them in this department; and at the request of exhibitors in this class, I would suggest that the Society provide a building or place for this purpose, and I herewith submit a letter recently received from Mr. Cutting, a prominent exhibitor, upon this subject.

The Awarding Committee in this department performed their duties promptly and thoroughly, and, judging from expressions of exhibitors, entirely satisfactorily; not a protest having been made, to my knowledge.

Respectfully submitted.

CHARLES KIPP,
Superintendent.

St. Johns, January 5, 1880.

All the reports except that upon Forage, were referred to the Committee on Premium List.

The Executive Committee then adjourned until to-morrow morning at 9 o'clock.

THIRD DAY.

MICHIGAN EXCHANGE,
Detroit, January 14, 1880.

The Executive Committee of the State Agricultural Society resumed its session, President Phillips in the chair.

Present—Messrs. Sterling, Rising, Hanford, Ball, Greene, Cobb, Fralick, Hyde, Manning, Smith, Burrington, Wood, Parsons, Angel, Howard, Harrison, Butterfield, Gilbert, McKay, Shoemaker, Baxter, Kipp, President, Treasurer, Secretary.

Leave being granted, the rules were suspended and Mr. Kipp presented the protest of A. D. Power, of Farmington, against the award of the Higgins Eureka Salt premiums to A. B. Smith and Wm. Allen, on the ground that the cheese entered by those parties was not salted with the Higgins Eureka salt.

Mr. Power being present, was invited to make a statement of the matter, which he did.

Mr. Rising moved to refer the matter to the Superintendent in charge of the department with full power to act. Carried.

REPORTS OF SPECIAL COMMITTEES.

To the President and Executive Committee of the State Agricultural Society:

The Committee to whom was referred so much of the address of President Phillips as refers to the Agricultural College, would respectfully report: That the recommendation of the President that the Executive Committee should visit the College, is cordially approved by the Committee, and the adoption of the following resolution is recommended:

Resolved, That the Executive Committee meet at and visit the Agricultural College and examine the working of the farm at the call of the President of this Society, at such time in the summer of this year as he may determine upon.

All of which is respectfully submitted.

M. SHOEMAKER,
WM. BALL,
CHARLES KIPP,
Committee.

The report was accepted and adopted.

To the President and Executive Committee of the State Agricultural Society:

Your Committee, to whom was referred that portion of the President's Address having reference to the Michigan State Pomological Society, ask leave to report the following: We have had a conference with a committee of gentlemen from and representing that Society, and after a careful and full deliberation of various matters connected, are united in recommending that said Pomological Society shall in case they see fit to exhibit with us the current season, and which we invite them to do, be allowed the same money consideration of the past year, viz.: $1,000 for payment of premiums (provided this amount is awarded), and $1,400 for actual expenses, a total of $2,400. The time and manner of payment of the $1,000 for premiums same as of previous years, that is, by premium check drawn by them on our Treasurer and due upon presentation by parties holding premium checks.

It is to be distinctly understood that the $1,400 appropriation from this Society is to reimburse the Pomological Society for expenses actually incurred by them in holding meeting and making exhibits, and that said amount of $1,400, nor any portion of it, is to be anticipted by them. And that payments of different installments of last named sum shall be obtained in the same form and manner as any other claim against the State Agricultural Society, that is, by voucher drawn upon our Society by an authorized officer or committee of the Pomological Society, and not due until properly drawn by an officer designated by that Society. The foregoing is binding upon this Society only upon a written acceptance of the same from the Pomological Society.

Respectfully submitted.

HENRY FRALICK,
F. V. SMITH,
A. J. DEAN,
Committee.

Above conditions accepted by us.

T. T. LYON,
Pres. Mich. State Pom. Socy.

The report was accepted and adopted.

THE PREMIUM LIST.

The Premium List Committee appeared, and Mr. Wood, on behalf of that committee, asked for instructions as to placing the different breeds of Cattle upon an equality.

Mr. Baxter moved that the views expressed by the retiring and incoming Presidents in their addresses at this session be accepted as the policy of this Society upon the questions referred to.

After discussion by Messrs. Wood, Greene, Baxter, Ball, Butterfield, Shoemaker, Parsons, and the President and Secretary, the motion of Mr. Baxter prevailed by the following vote:

Yeas—Messrs. Sterling, Rising, Ball, Greene, Fralick, Hyde, Manning, Burrington, Harrison, Baxter, Kipp, President, Treasurer—13.

Nays—Messrs. Hanford, Cobb, Wood, Parsons, Angel, Howard, Butterfield, McKay, Shoemaker, Secretary—10.

On motion of Mr. Baxter it was unanimously resolved, as the opinion of this committee, that competition in all departments of the State fair be open to the world.

Mr. Ball moved a reconsideration of the vote by which the motion of Mr. Baxter relative to equalizing premiums for the different breeds of cattle was adopted.

The motion to reconsider was lost by the following vote:

Yeas—Messrs. Hanford, Ball, Cobb, Wood, Parsons, Angel, Howard, Butterfield, Shoemaker, Secretary—10.

Nays—Messrs. Sterling, Rising, Greene, Hyde, Manning, Burrington, Harrison, Kipp, President, Treasurer—10.

The committee then took a recess until 4 o'clock P. M.

Afternoon Session.

The Executive Committee resumed its session pursuant to adjournment, the President in the chair.

Leave being granted, D. T. Dewey, Superintendent of the Poultry Department, presented the protest of George L. Gibson & Co., of Detroit, complaining of the award made on pigeons at the last State Fair. Mr. Dewey verbally reported adversely to the protest, and his report was adopted.

A communication was received from Mrs. S. M. Leggett, Mrs. C. S. Cushing, Mrs. J. W. Andrews, representing the Woman's State Christian Temperance Union, asking for the enforcement of rule 9 of the published rules relative to the sale of spirituous or intoxicating liquors on the fair grounds during the fair, or the enactment of a more stringent rule. The communication was referred to the Business Committee.

On motion a recess was taken until 7 o'clock P. M.

Evening Session.

The Executive Committee resumed its session at 7 o'clock, pursuant to adjournment.

REPORTS OF STANDING COMMITTEES.

To the President and Executive Committee of the State Agricultural Society:

Your Committee on Finance, to whom was referred so much of the President's address as refers to an investment of the funds of the Society and the financial policy thereof, and fixing the amount of the bonds to be given by the Treasurer and Secretary of this Society, respectfully report that they have had the same under consideration, and recommend that the Treasurer be and hereby is authorized and instructed to purchase in the name and for the use of this Society $10,000 of United States four per cent. registered bonds, at the best terms he can obtain, and hold the same as an investment for the Society; that the bonds of the Treasurer be fixed at the sum of $30,000, and of the Secretary at $1,000; and we further recommend that the present commendable general financial policy, especially in reference to the procuring and disposition of the tickets, the close supervision of the gates, and the careful scrutiny of all purchases made, bills and vouchers required and rendered therefor, and judicious expenditure of the funds of the Society by the Business Committee, be continued; and further report that, in our opinion, the books and accounts of the Treasurer are kept, and the funds disbursed in a careful, correct and satisfactory manner, both to the Society and exhibitors.

All of which is respectfully submitted.

HENRY FRALICK,
F. V. SMITH,
E. W. RISING,
Finance Committee.

The report was accepted and adopted.

Mr. Dean, the Treasurer, then presented his bond, which was referred to the Finance Committee.

The committee then adjourned until to-morrow morning at 9 o'clock.

FOURTH DAY.

Michigan Exchange,
Detroit, January 15, 1880.

The Executive Committee of the State Agricultural Society resumed its session this morning, pursuant to adjournment, the President, Hon. Geo. W. Phillips, in the Chair.

Present—Messrs. Sterling, Rising, Hanford, Ball, Greene, Cobb, Fralick, Hyde, Manning, Smith, Burrington, Wood, Parsons, Angel, Howard, Harrison, Butterfield, Gilbert, McKay, Shoemaker, Baxter, Kipp, President, Treasurer, Secretary.

REPORTS OF SPECIAL COMMITTEES.

To the President and Executive Committee of the State Agricultural Society:

The Special Committee to whom were referred all the recommendations of Judges and Superintendents for discretionary premiums, would respectfully report: That they have carefully examined the list of such recommended premiums furnished by the Secretary, and have found great difficulty in arriving at any satisfactory decision, for the reason that in many instances no amounts are even suggested, and in other cases the amount is merely suggested by saying we recommend a first, second, third, or fourth premium, naming no amount, and premiums of each description in the division and class, varying largely in amount, so that such designation furnished no intelligible guide. Again, in many cases diplomas are recommended, when, from the character of the exhibit, if a money premium had been recommended, it is evident that from $1 to $5 would have been the limit of the recommendation. It will be remembered that the diploma of this Society represents a premium in no case of a money value of less than $25, and we cannot consent by such awards of diplomas, as are in many cases recommended, to cheapen, discredit, and render nearly or quite valueless this evidence of the Society's appreciation of exhibits at its Fairs. Laboring under these disadvantages, your committee cannot flatter themselves that they will in all cases have arrived at conclusions just to either exhibitors, Superintendents or committees, who have made such recommendations, and much less at conclusions satisfactory to exhibitors, but they have endeavored, carefully, laboriously, and conscientiously to perform the duty assigned them.

Among the recommendations of the Viewing Committees, which we have not deemed it advisable to concur in, are two or three which require more than a passing notice.

The Combination Gas Manufacturing Company made an exhibit of gas fixtures, chandeliers, etc., and of several machines in operation, furnishing light for the hall, etc.; and the Committee recommended in addition to $10 in money and a medal, a cash premium of $25. Your Committee regard the $10 money award and the medal of the Society as a suitable and sufficient recognition, the space furnished and the opportunity of advertising by allowing the machines to be exhibited in actual operation in one of our principal halls, being all that was asked or expected by the exhibitor. Messrs. G. S. Wormer & Sons, as has been their custom for years, made a very large and valuable exhibit of machinery, tools, etc., attracting great attention and adding very much to the completeness of the exhibits in that department, and the Viewing Committee recommended a money award of $50. Messrs. Pingree & Smith erected at their own expense on grounds set apart for their use by the Society, a building, and supplied it with suitable machinery for the purpose, for the manufacture of boots and shoes, and kept it open for inspection, with 35 operatives constantly employed during the entire Fair. This enterprise was new, very instructive, and added very much to the attractions and completeness of the Fair. The Viewing Committee recommended a money premium of $75.

Your committee do not underestimate or undervalue either of the exhibits above named, but on the contrary would specially acknowledge our obligations to the gentlemen for their respective exhibits. The well known character and standing of both these parties, and our appreciation of the motives and public spirit that induced them to make their valuable contributions to the Fair, induce us to believe that a money award would be exceedingly distasteful to them, and that they will appreciate and value as a much more suitable recognition of their efforts in behalf of the Society, the medal and diploma of the Society, which we have in each case recommended.

There are other special exhibits such as the printing press, electrotyping process, etc., by the Free Press company; the exhibits of M. S. Smith & Co., E. B. Smith & Co., and Richmond & Backus. The northern exhibit, so called, and numerous others called for special mention, but time and space will not permit, and we trust the awards of diplomas, medals, etc., will be regarded as due recognition.

In the lists furnished us it is somewhat difficult to discriminate at times between articles, animals, etc., which are designed to be noticed by honorable mention, and especially worthy, interesting, etc., and those intended to be recommended for a premium. We have so far as possible consulted with Superintendents of different departments, learned, if possible, the intention of the Viewing Committees, and while not always coinciding entirely with Superintendents of departments, as to the propriety of awards, we have given great deference to their opinions. There were recommended for special mention or premiums 521 different exhibits.

Premiums over and above those offered or awarded were recommended as follows:

In money	$977 00
Twenty-six medals, valued at	260 00
Eighty-four diplomas, valued at	2,100 00
Making a total of	$3,337 00

We have recommended the award of an amount in the aggregate as follows:

Money premiums	$386 50
Twelve medals, valued at	120 00
Thirty-two diplomas, valued at	810 00
In the aggregate	$1,316 50

The exhibits on which we recommend premiums, and the character and amount of premiums, are mentioned below. All articles or exhibits not so named are commended as worthy of special notice, and will be so published. The word "Discretionary" indicates that the exhibit is of a kind for which premiums were offered and awarded and additional premiums were recommended. "Non-enumerated" indicates that no premiums were offered, but the exhibit was such as to be entitled to a premium.

DIVISION B—NON-ENUMERATED.

Class 17, No. 145	$15 00
Class 16, No. 288	20 00

DIVISION M—NON-ENUMERATED.

Class 61, No. 500	1 00

DIVISION F—DISCRETIONARY.

Class 32, No. 255	2 00

Non-enumerated.

Class 33, No. 1764	5 00
Class 33, Nos. 1765, 1771	3 00
Class 32, Nos. 506, 511	5 00

DIVISION E—CLASS 31.

In this entire class and division the recommendations seem to us only recommending duplicate premiums, that is two first and two second premiums in each case when recommended. But at lowest amounts (no amounts being named, but recommendations being first premium and second premium in each case) would amount to $60. It may be an error in copying lists for us, and if the special discretionary premiums only in fact amount to $11, as stated by the Superintendent of this department in his report, we would coincide in his recommendation that the amounts be paid; but as shown in copy of recommendations presented to us, we must recommend that the entire class be passed without any discretionary awards.

DIVISION H—DISCRETIONARY.

Class 45, No. 465	$1 00
" " 470	1 00

Non-enumerated.

Class 46, No. 1	50
“ “ 3	50
“ “ 4	1 00
“ “ 5	50
“ “ 6	50
“ “ 209	1 00

DIVISION I—NON-ENUMERATED.

Class 47, No. 460	1 00
“ “ 514	3 00
“ “ 509	3 00

DIVISION H—NON-ENUMERATED.

Class 4,2 No. 406	5 00
“ “ 389	2 00

DIVISION J—DISCRETIONARY.

Class 48, No. 328	Diploma.
“ “ 160	Medal.
“ “ 1082–3	Medal.
“ “ 1426	Medal.
“ “ 1709	Diploma and Medal.

Non-enumerated.

Class 48, No. 1762–1791	Diploma and Medal.
“ “ 1829	Medal.

DIVISION K—DISCRETIONARY.

Class 52, No. 241	1 00
“ “ 265	1 00
“ “ 288	1 00

Non-enumerated.

Class 53, No. 169	1 00
“ 54, “ 666	3 00
J. B. Stevens & Co., gents' winter boots	1 00
J. B. Stevens & Co., ladies' summer boots	50
Johnson & Thomas, gents' winter boots	50

Non-enumerated.

Class 56, No. 520	1 00
“ “ 521	2 00
“ “ 522	2 00
“ “ 523	2 00

DIVISION K—NON-ENUMERATED.

Class 56, No. 524		1 00
“ “ 525		1 00
“ “ 526		2 00
“ “ 529		2 00
“ “ 580	Medal and	2 00
“ “ 531	Medal and	4 00
“ “ 532	Medal and	2 00
“ “ 533	Medal and	2 00
“ “ 534		2 00
“ “ 241		1 00
“ “ 242		1 00
“ “ 355		1 00
“ “ 399		1 00

DIVISION L—DISCRETIONARY.

Class 57, No. 2	1 00
“ “ 76-100	Diploma
“ “ 291	1 00
“ “ 347	1 00
“ “ 360	1 00
“ “ 149	Diploma

DIVISION L—DISCRETIONARY.

Class 57,	No. 150		$2 00
“	“ 151		1 00
“	“ 372		1 00
“	“ 506		1 00
“	“ 507		2 00
“	“ 508		1 00
“	“ 52		5 00
“	“ 211		3 00
“	“ 281		3 00
“	“ 509		Diploma
“	“ 510	Diploma and	2 00
“	“ 513	Diploma and	1 00
“	“ 516	Diploma and	1 00
“	“ 517	Diploma and	3 00
“	“ 522-525		Diploma
“	“ 526	Diploma and	1 00
“	“ 527	Diploma and	1 00
“	“ 528	Diploma and	1 00
“	“ 530	Diploma and	1 00
“	“ 533	Diploma and	1 00
“	“ 536	Diploma and	2 00
“	“ 542	Diploma and	1 00
“	“ 543		Diploma
“	“ 548		Diploma
“	“ 550		Diploma
“	“ 552		Diploma
“	“ 553	Diploma and	1 00
“	“ 554	Diploma and	2 00
“	“ 556	Diploma and	1 00

DIVISION M—NON-ENUMERATED.

Class 59,	No. 175	1 00
“	“ 191	1 00
“	“ 242	1 00
“	“ 539	2 00
“	“ 680	5 00
“	“ 676	3 00
“	“ 1205	1 00
“	“ 1323	3 00
“	“ 1734	2 00
“	“ 1735	5 00
“	“ 1760	2 00
“	“ 1761	2 00
“	“ 1762	1 00
“	“ 1802	3 00
“	“ 1803	3 00
“	“ 1805	3 00
“	“ 1806	3 00
“	“ 1807	Diploma
“	“ 1808	2 00
“	“ 1810	2 00
“	“ 1812-1814	Diploma
“	“ 1815	1 00
“	“ 1817-1818	Diploma
“	“ 1821	3 00
“	“ 1825	1 00
“	“ 1828	3 00
“	“ 1829	2 00
“	“ 1833	3 00
“	“ 1834	2 00
“	“ 1835	2 00
“	“ 1836–7	3 00
“	“ 1839	3 00
“	“ 1841	3 00
“	“ 1842	3 00

DIVISION M—NON-ENUMERATED.

Class 60, No. 381	$2 00
" " 222	2 00
" " 223	1 00
" " 404	2 00
" " 406	2 00
Class 61, No. 6	3 00
" " 151	3 00
" " 501	3 00
" " 504	1 00
" " 506	1 00
" " 507	1 00
" " 508	50
" " 509	50
" " 8	50
" " 12	2 00
" " 49	1 00
" " 121	2 00
" " 124	2 00
" " 146	1 00
" " 169	2 00
" " 289	1 00
" " 510	2 00
" " 511	1 00
" " 3	8 00
" " 28	2 00
" " 420	2 00
Class 62, No. 64	2 00
" " 107	2 00
" " 105	1 00
" " 291	2 00
" " 293	2 00
" " 466	3 00
" " 478	2 00
" " 482	1 00
" " 483	1 00
" " 484	2 00
" " 491	3 00
" " 493	5 00
" " 1, Vol. 2	3 00
" " 2, "	1 00
" " 3, "	2 00
" " 4, "	50
" " 10, "	2 00
" " 11, "	2 00
" " 15, "	2 00
" " 18, "	2 00
" " 19, "	1 00
" " 22, "	1 00
" " 24, "	1 00
" " 28, "	2 00
" " 35, "	2 00
" " 37, "	1 00
Class 62, No. 66, Vol. 2	2 00
" " 74, "	2 00
" " 78, "	2 00
" " 79, "	2 00
Class 63, No. 73, "	1 00
" " 74, "	2 00
" " 77, "	1 00
" " 123, "	50
" " 127, "	50
" " 245, "	1 00
" " 247, "	2 00
" " 335, "	1 00

Class 63, No. 424, Vol. 2	$1 00
" " 425-9,	3 00
" " 430, "	1 00
" " 431, "	1 00
" " 433, "	1 00
" " 434, "	50
" " 435, "	2 00
" " 439, "	2 00
" " 440, "	1 00
" " 441, "	1 00
" " 442, "	50
" " 443, "	50
" " 444, "	50
" " 445, "	50
Class 64, No. 29, "	1 00
" " 30, "	1 00
" " 36, "	2 00
" " 39, "	2 00
" " 40, "	1 00
" " 42, "	2 00
" " 151, "	2 00
" " 154, "	1 00
" " 406, "	2 00
" " 408, "	2 00
" " 409, "	2 00
" " 410, "	2 00
" " 415, "	2 00
" " 419, "	3 00
" " 426, "	2 00
" " 428, "	2 00
" " 433, "	2 00

DIVISION N.

Class 66, No. 3, Vol. 2	4 00
" " 183, "	medal
" " 255, "	3 00
" " 390, "	2 00
" " 484, "	1 00
" " 485, "	1 00
" " 478, "	1 00
" " 482, "	1 00
" " 487, "	1 00
" " 488, "	medal
" " 489, "	1 00
" " 490, "	diploma
" " 480, "	1 00

DIVISION M.

Class 64, No. 474, Vol. 2	1 00
" " 470, "	diploma
" " 465, "	1 00
" " 464, "	4 00
" " 462, "	4 00
" " 454, "	5 00
" " 452, "	1 00
" " 446, "	1 00
" " 443, "	2 00
" " 444, "	1 00
" " 440, "	1 00
" " 438, "	1 00
" " 437, "	1 00
" " 413, "	2 00
" " 415-16,	diploma
" " 417, "	1 00
" " 418, "	1 00
" " 419, "	2 00

Class 64, No. 420, Vol. 2	medal
“ “ 422, “	$2 00
“ “ 423, “	1 00
“ “ 425, “	2 00
“ “ 428, “	medal

DIVISION N.

Class 66, No. 430, Vol. 2	1 00
“ “ 431-2, “	medal
“ “ 322, “	1 00
“ “ 323, “	1 00
“ “ 334-6, “ Display of Earthen and Terra Cotta ware	diploma

Your committee would remark that the commendable efforts of Viewing Committees and Superintendents to secure notice of all articles exhibited deserves especial notice; and if in their earnest desire that no meritorious exhibit should be overlooked, they have recommended premiums in such number and amount that the funds of the Society and justice to successful competitors for regularly offered premiums require careful scrutiny and judicious curtailment at our hands, their thoroughness, zeal and earnest desire to give universal satisfaction deserve commendation. Your committee feel impelled, however, to urge upon Superintendents in charge a careful examination of the books of Viewing Committees after their work of examination is completed, and before cards or ribbons are given out, that expectations may not be raised of receiving premiums, which must inevitably be disappointed. In some whole classes, and even divisions, this does not appear to have been done at our last exhibition, and every article exhibited, or so nearly so, that an omission is the exception and not the rule, has been recommended for special or discretionary premiums, to an amount in many cases larger than the market value of the exhibit.

This must necessarily lead to a good deal of disappointment, and in many cases, no doubt, to an impression that exhibitors have not been treated with proper consideration and respect.

Respectfully submitted,

W. J. BAXTER,
J. M. STERLING,
HENRY FRALICK,
Committee.

The report was accepted and adopted.

MISCELLANEOUS BUSINESS.

The Treasurer, Mr. Dean, presented a claim of Max Hochgraef for engraving medals in 1876.

On motion of Mr. Dean the claim was allowed and ordered paid.

Mr. Hampton of Detroit, an exhibitor of cider making machinery, addressed the Committee upon the subject of exhibiting such machinery in Machinery Hall. He thought he had a right to space in such hall, and desired some action upon the matter.

Mr. Baxter moved, as the sense of this Committee, that the rule forbidding the sale of articles by exhibitors for premiums be strictly enforced. Carried.

Mr. Greene presented an invitation from the Manager of the Free Press, to visit and inspect that office. On motion of Mr. Greene, the invitation was accepted.

An invitation to visit the boot and shoe factory of Pingree & Smith was also accepted.

The President presented the invitation of Mr. Lasier, to visit the Board of Trade at 3 o'clock. On motion of Mr. Parsons, the invitation was accepted.

The following was offered by Mr. Shoemaker:

Resolved, That the thanks of the Executive Committee of the State Agricultural Society be, and are hereby, tendered to Hon. Philo Parsons for the hospitable and elegant manner in which they were entertained at the reception given at his house on the evening of the 14th inst.

Adopted.

The Committee then took a recess until 2 P. M.

Afternoon Session.

The Executive Committee resumed its session, President Phillips in the chair.

Mr. Shoemaker offered the following:

Whereas, It is of great importance to breeders of Horses in this State that our exhibitions should be conducted according to the rules and conditions which have been found necessary and appropriate for fair trials; and

Whereas, Our trials of speed have heretofore been made under rules adopted by the National Association, but without any power to enforce them, and such rules have been found necessary; and

Whereas, Membership with the National Association has been found advantageous, in so far as the State and County Agricultural Societies are concerned, both to the breeders of Horses and the Associations of State and County Societies if allowed at moderate rates, as tending to insure order and fairness, and the awards in strict justice to competitors; therefore

Resolved, That we hereby recommend that the National Association, for the purpose of aiding the breeders of Horses, and giving a more efficient control of trials of speed, under the charge of Agricultural Societies, allow such societies to become members, on terms not exceeding an annual subscription of twenty-five dollars ($25).

Resolved, That in furtherance of the interest of breeders, and of such State and County Agricultural Societies, it is hereby recommended that said National Association do adopt a law by which "time shall be no bar" in trials of speed, where such Agricultural Societies offer as a first premium not over one hundred and fifty dollars ($150).

Resolved, That the Secretary be and is hereby directed to publish this preamble and resolutions, and transmit an official copy of the same to the National Asssociation.

Adopted.

The committee then took a recess until 5 P. M.

The committee resumed business at 5 o'clock.

REPORTS OF STANDING COMMITTEES.

To the President and Executive Committee of the State Agricultural Society:

Your Committee on Finance, to whom was referred the financial portion of the Secretary's report, have had the same under consideration, and respectfully report: That we have carefully examined the same, and compared his account of checks drawn, with the vouchers therefor, the checks with the stubs, and find them to agree; the list of membership tickets sold, and find them correct; and the money received therefor paid to the Treasurer, for which he holds his receipt; and find his statement of the amount of regular premiums and number of medals and diplomas offered to agree with the list; and from a close examination of the Division and Class books, and the reports of the Awarding Committees, find the amount of the cash premiums and the number of medals and diplomas as stated to be awarded by him to be correct; and as all that part of this report relating to the subject of discretionary premiums and other matters has been referred to a Special Committee, we therefore ask to be discharged from its further consideration.

All of which is respectfully submitted.

HENRY FRALICK,
F. V. SMITH,
E. W. RISING,
Finance Committee.

The report was accepted and adopted.

The committee then took a recess until 7 P. M.

Evening Session.

The Executive Committee of the State Agricultural Society resumed its session, pursuant to adjournment, President Phillips in the chair.

Mr. Dean offered the following:

Resolved, That the printing and furnishing of admission, or gate tickets, for the Fair of 1880, be done by or under the care of the Finance Committee.

Adopted.

REPORTS OF STANDING COMMITTEES.

The Committee on Premium List submitted a detailed report of premiums to be offered in the various classes for the Fair of 1880.

Mr. Baxter moved the adoption of the report.

Mr. Hanford moved to amend the report so that the premiums in Division A, Classes 1, 2, 3, 4, 5, 6 and 7, in the list of 1879, remain as the premium list for 1880.

Lost as follows:

Yeas—Messrs. Hanford, Ball, Wood, Parsons, Angel, Howard, McKay, Secretary—8.
Nays—Messrs. Sterling, Rising, Greene, Cobb, Fralick, Hyde, Manning, Smith, Burrington, Harrison, Butterfield, Baxter, Kipp, President, Treasurer—15.

Mr. Parsons moved that all fourth premiums upon animals be stricken from the Premium list. Lost.

Mr. Hyde offered as an amendment to the report of the committee the reinstatement of Class 20, Division B, as follows:

Roadster Stallion, with six colts of his own get	$30
Draught Stallion, with six colts of his own get	30
Stallion for all work, with six colts	30

Lost by the following vote:

Yeas—Messrs. Ball, Greene, Hyde, Parsons, Harrison, McKay, Baxter, Secretary—8.
Nays—Messrs. Sterling, Rising, Hanford, Cobb, Fralick, Manning, Smith, Burrington, Wood, Angel, Howard, Butterfield, Kipp, President, Treasurer—15.

The report of the Committee on Premium List was adopted.

Mr. Cobb was excused from further attendance at this session of the Committee.

Mr. Baxter offered the following:

Resolved, That a class be added of Premiums on Herds under the same rules as Division A, Class 11, as last year, on each breed as therein named:

Frst premium	Diploma
Second premium	Medal

The resolution was laid on the table.

The report of the Committee on Rules was presented by Mr. Ball.

Mr. Smith moved to refer back to the Committee with instructions to report an additional rule to fix the standard of pedigree of cattle, to be defined by certain recognized herd books. Carried.

Mr. Parsons offered the following:

Whereas, In our judgment, the future success of the annual Fairs of the Michigan State Agricultural Society depends very largely on the broad and intelligent liberality of the various railroads centering in this city, or reaching points where the Fair may at any time be held, in the matter of transportation of live stock and all else that may contribute to the success of the Exposition; and

Whereas, In our opinion, the attendance at the annual Fairs has been checked in parts of the State where freight has been charged on such stock and articles for exhibition; and, *Whereas*, The present owners of these great lines of railroad running through the State of Michigan, purchased their controlling interest in these great thoroughfares at very serious loss to the original self-denying, enterprising owners and builders, in times of commercial depression to their great profit; therefore

Resolved, That it is our deliberate and unanimous conviction that these roads should look for their compensation from an increased passenger traffic, rather than from transit charges on that character of freight that makes up the interests of our annual Fairs.

Resolved, That we desire no antagonism with the railroads. We have received and are receiving constantly many courtesies from them, for which we are very grateful, and our action now is simply because we fear the imperilment of our cherished institution, which has so greatly developed the best material interests of the State.

The resolutions were adopted.

The Committee then adjourned until to-morrow morning at 9 o'clock.

FIFTH DAY.

MICHIGAN EXCHANGE,
Detroit, January 16, 1880.

The Executive Committee of the State Agricultural Society resumed its session this morning, pursuant to adjournment, the President, the Hon. Geo. W. Phillips in the chair.

Present—Messrs. Sterling, Rising, Hanford, Ball, Greene, Fralick, Hyde, Manning, Smith, Burrington, Wood, Parsons, Angel, Howard, Harrison, Butterfield, McKay, Baxter, Kipp, and the President, Treasurer and Secretary.

MISCELLANEOUS BUSINESS.

The Secretary read a communication from H. B. Chapman of Coldwater, renewing a protest regarding a premium upon horses at the Fair of 1870.

Accepted and placed on file.

The Secretary presented the matter of the claim of H. C. Pearson, of Ferrisburg, Mass., relative to silver medals awarded to mathematical instruments at the Fair of 1878.

On motion of Mr. Sterling, the matter was referred to ex-President Webber with power.

Mr. Baxter called up from the table his resolution of the previous evening, with reference to premiums upon Herds of Cattle.

Leave being granted, he withdrew the resolution and offered the following instead:

Resolved, That in Division A another class be added—Herds; rule standing as in Class 11 last year, except that in each class at least three entries be required. Premiums as follows:

Herd—Shorthorns	$30 00
" Devons	30 00
" Herefords	30 00
" Ayrshires	30 00
" Jerseys	30 00
" Galloways	30 00
" Holsteins	30 00

That in Division B another class be added to be named Sweepstakes, for Stallion, with six colts of his own get:

Roadsters	$30 00
Horses of all work	30 00
Draught horses	30 00
Thoroughbreds	30 00

Not less than two entries required in each class.

At the request of Mr. Ball, the question was divided, and being taken first on the premiums for Herds of Cattle, the same was adopted.

The second portion of the resolution, relative to premiums upon Horses, was also adopted.

REPORT UPON PROTESTS.

To the President and Executive Committee of the State Agricultural Society:

Your Committee, to whom was referred the protest against the awards of the Viewing Committee in the Dairy Department, in Special Class of Premiums, offered by H. K. & F. B. Thurber & Co., beg leave to make the following report: I find in Class 35½. Special Premiums, there were three entries for three premiums on cheese salted with Higgins' Eureka Salt, viz.: A. D. Power, Farmington; Wm. Allen, Livonia; A. B. Smith, Farmington. And the awards, as appears from the Committee books, were made as follows: A. B. Smith, Farmington, third, bronze medal; A. D. Power, Farmington, second premium, silver medal; Wm. Allen, Livonia, first, gold medal. (See Rules 5 and 6, page 18.)

Against this award there was a protest filed September 18, 1879, by A. D. Power. (See protest.) The Secretary informs me that, some time previous to the meeting of the Executive Committee, he notified Mr. A. B. Smith that a protest had been made, and requested him to appear before the Committee and substantiate his claim for the award made. By order of the Executive Committee, on Tuesday last, the Secretary addressed a note to these parties informing them of the action of the Executive Committee, asking their immediate attendance before the Committee. Up to this time they have not appeared, and I am of the opinion that the protest should be sustained.

CHARLES KIPP,
Superintendent.

The report was accepted and adopted.

REPORT ON RULES.

The Committee on Rules presented their report:

RULES AND REGULATIONS FOR THE GOVERNMENT OF THE EXECUTIVE COMMITTEE.

1. At each annual meeting of the Executive Committee there shall be appointed, in such manner as the Committee may decide, six standing committees, each to consist of three members, except Committee on Premiums, which shall consist of five members, as follows:

1. Business and Transportation Committee.
2. Finance Committee.
3. Committee on Premiums.
4. Committee on Rules and Regulations.
5. Committee on Printing.
6. Committee on Reception, to look after guests, visitors, and strangers.

The President of the Society shall be ex officio a member of each of the foregoing committees in addition to the other members, and if present at any committee meeting, shall have the right to preside. Special committees may be appointed by the Executive Committee, as may seem best, and charged with such duties as the Executive Committee may order.

2. The President of the Society shall be Chairman at all meetings of the Executive Committee at which he may be present. In his absence, such member of the Committee as shall be chosen for that purpose shall act as Chairman.

3. The Secretary of the Society shall act as Secretary of the Executive Committee. In case of his absence, inability or refusal to act, the Committee may appoint a Secretary *pro tem.*

4. No pecuniary consideration or inducement, other than the premiums offered, shall be paid to exhibitors entering for premiums.

5. All protests against the awards of Viewing Committees must be in writing, and must state particularly the grounds thereof; and no protest will be considered unless for some cause other than errors of judgment on the part of the Viewing Committee. All protests must be filed with the Secretary on or before the last day of the Fair, or they will not be entitled to receive attention.

6. When a protest is regularly made, the same shall be referred to a special committee, whose duty it shall be to ascertain and report the facts to the Executive

Committee, and such report shall be deemed final, and on the facts so reported the Executive Committee shall determine the case.

7. All moneys received by the officers, or by members of the Executive Committee, for the Society, shall, as soon as practicable, be paid over to the Treasurer, and his receipt therefor taken, and no money shall be paid out for the Society except by the Treasurer, who shall pay on proper orders drawn on him for the purpose. The order so drawn shall show the specific object for which the same was given.

8. Except for investment and orders for premiums duly awarded, no orders shall be drawn on the Treasurer, except on accounts duly audited and allowed by the Business Committee, and such allowance endorsed thereon by a majority of said committee.

9. An appeal may be taken in all cases from the action of any standing committee to the Executive Committee, but the decision of such standing committee shall be considered as the rule governing the case until the Executive Committee shall otherwise order.

10. It shall be the duty of the Business Committee to carry out the instructions of the Executive Committee in relation to the pecuniary affairs of the Society, and in regard to preparing for and holding Fairs. The Business Committee shall keep a record of all accounts allowed, and shall allow no accounts except such as show the items and appear to be correct and duly authorized. They shall make a full report of all accounts allowed by them, and other orders made by them, at each annual meeting of the Executive Committee.

11. The Business Committee shall have the general charge of the property of the Society (except the moneys in the hands of the Treasurer), and in relation thereto shall obey such instructions as the Executive Committee shall give from time to time. Such Business Committee shall properly care for such property, and shall report annually to the Executive Committee the amount or quantity, situation and condition of the same.

12. In all cases where no other provision is made, the said Executive Committee shall be governed by the rules of parliamentary laws as laid down in Jefferson's Manual.

13. The order of business at each meeting of the Executive Committee shall be as follows:

1. Calling the roll.
2. Reading and approving the proceedings of last meeting.
3. Addresses and communications from the President.
4. Reports from Standing Committees.
5. Reports from Special Committees.
6. Reports from Executive Superintendents.
7. Hearing appeals and considering same.
8. Unfinished business.
9. Miscellaneous business.
10. Motions and resolutions.
11. Notices.

This order of business may be suspended or changed for that meeting only, by a two-thirds vote of the members present at any meeting of the Executive Committee.

GENERAL RULES AND REGULATIONS OF THE MICHIGAN STATE AGRICULTURAL SOCIETY.

I.—MEMBERS.

§1. Any person may become a member of this Society for one year by paying one dollar into the treasury. He will receive an annual certificate of membership, with one coupon admission ticket attached.

§2. Members are entitled to the privilege of voting and holding office, and competing for all premiums in any department, without further payment.

§3. Life members shall be entitled to the same rights and privileges in all respects as other members of the Society.

II.—OFFICERS.

§1. The Executive Committee will meet on the evening of each day of the Fair, at 7½ o'clock, at such Place as the President shall desinate, to transact such business as may be brought before them, and to hear reports of Executive Superintendents.

§2. The Secretary's office will be on the Fair grounds, each day of the Fair, where all business of his department will be transacted.

§3. The President's and Superintendent's office, during the days of the Fair, will be on the fair grounds.

§4. The office of the Marshal will be near the entrance gates, and distinguished by a red flag.

§5. The office of the General Superintendent of the grounds, during the Fair, will be at the President's office.

§6. Officers will be designated by ribbon badges, with the name of the office printed thereon.

§7. Each department will be in charge of one or more members of the Executive Committee, and exhibitors and judges will apply to such Superintendent for instructions in his department. Such Superintendents of each division shall be provided with a suitable office in the department of the hall and grounds assigned them, which shall be designated by appropriate and conspicuous signs. Superintendents of departments requiring an assistant may appoint such assistant by and with the advice and consent of the President. Each Superintendent of a department may also appoint a messenger, and if more than one messenger is considered necessary in any department, additional messengers may be appointed by and with the advice and consent of the President. Each Superintendent of a department shall in person or by his assistant and messenger be present at his office during hours of exhibition.

§8. It shall be the duty of each Superintendent in charge of a department, at the Annual Fair of this Society, to present to the Executive Committee, at the winter meeting succeeding each Fair, a written report upon the exhibition in his department, which report shall form a portion of the proceedings of the Society, and be published therewith; and when the Pomological Society exhibits with this Society, the Superintendent of that exhibition is requested to present a like report.

§9. The President of the Society will be at his office, at the Fair Grounds, at 9 o'clock A. M., each day, for the transaction of business. He may confirm the nominations of all assistants made by the members of the Executive Board in charge, and give general direction to the exhibition, and see that the published rules are executed.

§10. No obligations against this Society shall be created by any officer of the Society or member of the Executive Committee, without the written consent of the President or chairman of the Business Committee.

§11. When clerical assistance is required by the Secretary, no clerks shall be employed by him for the benefit of the Society, without consultation with and the consent of the President of the Society, both as to employment and compensation, and all bills for services of such clerks shall be certified by the President and Secretary before being allowed.

ELECTION OF OFFICERS.

The annual election of officers will take place on Thursday of the week of the Fair and the Secretary shall give public notice of the same through the posters and regular advertisements of the Fair, and such election shall be conducted as follows: The Executive Committee shall provide a proper ballot-box, to be kept at some convenient place on the Fair Grounds, and they shall appoint three proper persons, who shall conduct the election and receive the ballots of all members who are entitled and shall offer to vote, and said judges shall require each person offering to vote to present the proper certificate of membership, and shall keep a full register of the names of all persons voting at such election. The polls of said election shall be open at 9 o'clock A. M., and be closed at 5 o'clock P. M., on Thursday of the week of the Annual Fair. In case of a tie vote, the judges shall decide the matter in the manner provided by law for deciding the votes at township elections. The judges of the election, together with the President of the Society, shall duly canvass the votes so cast, and shall publicly announce the result immediately thereafter. The following rules shall govern such elections:

1. The Executive committee shall, on the first day of the Fair, appoint three persons, who shall be members of the Society, to act as judges of the election, and shall at the same time fix the place on the Fair Ground where the election shall be held.

2. Notice of the names of the judges and the place where the polls will be held, shall be given on the second day of the Fair, by publication and posting of notices in at least twenty prominent places on the Fair Grounds.

3. The names of all officers to be voted for shall be on one ticket.

4. Each member shall vote in person. All annual members shall present a membership certificate, which certificate the judges of election shall stamp to show that the same has been voted upon; and the judges shall also take the names of all life members who desire to vote and register the same, including the names of annual members, in a poll list, and shall then deposit the ballot in the box provided for that purpose.

5. If any judges of elections appointed by the Executive Committee be not present at the opening of the polls, the president shall immediately appoint some person or persons from among the members of the Society to fill such vacancy or vacancies.

6. Each of the judges shall, before entering upon the performance of his duties, subscribe a declaration that he will faithfully and impartially act as a judge of such election, and such declarations shall be filed with the Secretary.

7. The person having the highest number of votes for the office of President shall be declared elected, and a like rule shall be observed for the office of Secretary and Treasurer. The persons voted for as Executive Committee, to the number to be elected, having the highest number of votes, shall be declared elected.

8. Poll lists shall be made to agree with the count of ballots; votes folded together, and fraudulent and duplicate votes, shall be governed by the rule prescribed by law for the government of township elections.

III.—ADMISSION.

1. The gates will be opened at 8 o'clock A. M. of each day, at which time every officer and employé is expected to be at his post of duty.

2. Single tickets of admission at 50 cents each, and tickets for children under sixteen years of age at 25 cents each will be for sale at the Treasurer's office. All tickets will be taken up at the gate, as they are good for one admission only. Children under eight years of age free.

3. One horse and rider must have two tickets; one horse, carriage and driver, two tickets; two-horse vehicle and driver, three tickets. For each person other than driver, in any vehicle, one ticket will be required.

4. Admission to the grand stand will be 25 cents for each admission. Children under eight years free. The grand stand will be cleared by the police, and swept during the recess from 12:30 to 1:30 P. M. each day.

5. Editors and reporters will obtain tickets of admission from the President.

IV.—EXHIBITORS.

1. Competition is open to all, regardless of locality, unless otherwise specially provided.

2. Exhibitors must be members of the Society. Those making their entries by letter will remit the amount of the membership fee, with their entries, to the Secretary.

3. As the fair opens on Monday, officers of the Society will be in their respective places at the fair grounds on Friday and Saturday of the week previous to the fair to receive entries and arrange articles. To avoid hurry and confusion the entries should, as far as possible, be made the week before the fair.

4. All entries in Divisions A, B, C and D shall be made on or before Tuesday evening of the week preceding the fair, and in Divisions E, F, G and H on or before Thursday evening of the week preceding the fair. Each exhibitor will be expected to have each animal or article in its proper place on the grounds by the close of the first day of the fair. This rule shall not be varied, except it is shown that an unavoidable delay has been caused by accident or circumstances beyond control of the exhibitor, in which case the President may wave this rule.

5. Persons entering live stock must, at the time of entry, give a list of the stock, stating the age and the breed of the animals, the breeder's name and residence, and the particular class and division in which the animal is to be entered; and in case of thoroughbred, full pedigrees, duly certified, must be filed at the same time.

[NOTE.—An authenticated pedigree or statement of breeding should contain an affidavit of the breeder, stating the description of the animal, with the date of its birth, and the date of its sale, if out of his hands, and the names or description of the sire and dam.]

6. Copies of the premium list and blank forms for entries will be furnished on application to the Secretary. Exhibitors should make themselves acquainted with the premium list and requirements, and be sure in what class and division their entries properly belong, as it will be the duty of the judges to rule out any animal or article not answering to the entry. No change or alteration is permitted after the books are placed in the hands of the committees. Entries may be made for exhibition without competion, and viewing committees in the several classes may notice such as they shall deem worthy in their reports. But all entries must be made by members of the Society. Except for the herd and sweepstakes premiums, no animal or article can be entered in more than one class, or compete for more than one premium.

7. The Society reserves the right to refuse any entries offered, particularly such as require an unreasonable amount of room. All exhibitors must (except in the case of

live stock) state at the time of entry the space required by them, in order that proper quantity of space may be reserved.

8. Goods and stock must be delivered on the grounds and put in place by exhibitors, and removed by them at the close of the fair. No animal or article may be removed from the show ground until 1 o'clock P. M. of the last day of the fair. A transgression of this rule will incur forfeiture of any premium awarded.

9. Exhibitors wishing to erect separate buildings, and exhibitors requiring additional work in buildings or elsewhere, must apply to the President. In all such cases the exhibitor must bear the expense.

10. Exhibitors will not be allowed to sell goods during the fair without special permission of the President (though they may receive and book orders, and all articles or animals may have the price of each attached), nor will they be permitted to call attention to their wares in a noisy or disorderly manner.

11. All entries must be made in the name of the owner, or the name of the joint owners, actual growers, producers, inventors or manufacturers. The penalty for transgression of this rule w2ll be exclusion from the present exhibition of the Society.

12. The name and residence of the exhibitor, and number of exhibit in the class, will be entered in the Secretary's books, upon entry cards and upon books of the Viewing Committee.

13. Ample space and facilities for exhibition and display of articles, implements and machines entered for exhibition only, and not for premiums, will be furnished, and to all such a card or label may be attached, giving name and residence of exhibitor, name of machine, use and retail price.

14. Every article or animal upon the Fair Ground will be under the control of the Executive Committee, and every precaution will be taken for their safe keeping, but the Society will not be responsible for any damage or loss that may occur, and upon this condition entries are received.

15. Exhibitors having articles or animals on exhibition which require their constant supervision, care and attention, will be furnished with entrance tickets on application to the Superintendent in charge of the several departments, at such Superintendent's discretion, which tickets will be taken up on presentation at the gate.

Superintendents will procure such attendants' tickets at the office of the President, and each Executive Superintendent shall personally be at his office from four to five o'clock P. M., during each day of the fair, during which time exhibitors entitled to such attendants' tickets shall personally apply for the same, and the Superintendent shall keep a record of the names of such exhibitors and the number of tickets daily supplied to each.

So far as possible space in proper hall shall be assigned to each particular division and class, and articles entered for premiums must be assigned to the space thus set apart. The crowding of articles of an entirely different class and character into space thus set apart for any particular class should be avoided.

16. The entries in the several departments shall be arranged as nearly as possible as follows:

CATTLE—In the stables assigned them, the several breeds as nearly as practicable ranged together.

SHEEP AND SWINE—In the pens, according to their breeds.

HORSES—In the stables, as they may be assigned by the Superintendents of the Horse Department, with open doors in the daytime, unless the Superintendent in charge shall, in his discretion, allow the doors to be closed.

GENERAL RULES FOR LIVE STOCK—SHEDDING AT DISCRETION OF SUPERINTENDENTS.

Competition in all live stock shall be open to the world.

1. No animal may compete for more than one prize in any class or division, except for the herd or sweepstakes premiums.

2. Each animal will be required to be placed on the ground, in the division to which it belongs, by the agent or owner who has it in charge, and in the place assigned to it by the officer of the Society having charge of that department.

3. Stalls, stables and pens are provided for live stock, but where room cannot be made, then the Superintendent may permit such animals to have admission to the grounds at such times as he may deem proper. Places may be assigned in the order of application. No loose animals shall remain on the grounds.

4. Hay, straw and water are provided for live stock on the grounds, free of charge, from the Saturday preceding to the close of the Fair. Grain and feed will be provided for sale on the grounds, at the usual market rates.

5. Horses or other stock occupying stalls or pens must be entered on the books of the Secretary for exhibition, and if not shown in competition when called for by the awarding committee, will be charged one dollar per day for the time the stall or pen is occupied.

6. Grooms must be neatly and cleanly dressed when they lead out their stock for exhibition.

7. No persons other than the judges will be permitted to go into the rings where the stock is exhibited, except the officers of the Society or the Marshals, except upon the invitation of the Superintendent in charge.

V.—AWARDING OR VIEWING COMMITTEES.

The Superintendent shall appoint the Viewing Committees to act in the several departments under their charge.

1. The Awarding Committees are requested to report, as soon as they arrive upon the grounds, to the Superintendent of the division in which they are to serve, who will record their presence and inform them when their committee will be called upon to act.

2. On entering upon their duties, Awarding Committees will receive their badges, committee books, and instructions relative to their work, from the Superintendent in charge, to whom they will apply in all cases of doubt or difficulty.

3. Superintendents in charge will appoint the time for each Committee to act; they will fill all vacancies in committees, and when the reports are finished they will be returned to the Superintendent.

4. Each Superintendent in charge will see that the committee upon each class in his department report fully upon each article or animal in each class.

5. Committees will examine the premium list with care; they will in no case award a premium where there is no merit, though there be no competition, and in cases of partial merit, a second or third premium may be awarded, though no first or second premium be given. No discretionary premiums shall be recommended by Viewing Committees, except it be for articles or animals not enumerated.

6. Awarding Committees will be particular to have the number of awards, etc., entered in their books correctly, and when they have made their report they shall sign the same, and hand it to the Superintendent in charge as soon as possible. The Superintendent will examine the same, and when satisfied as to its correctness will deliver it to the Secretary, who shall report to the Executive Committee during the week of the Fair.

7. Awarding Committees are especially requested to do impartial justice both to exhibitors and to the Society.

8. No person or persons will be allowed to interfere with Awarding Committees in discharge of their duties.

9. Awarding Committees on cattle and horses will please have the prize ribbon tied upon the animals before sending them from the rings.

10. No person shall act as Superintendent of any department in which he is an exhibitor, nor shall any exhibitor act as a member of any Viewing Committee in any class in which he is a competitor.

VI.—PREMIUMS.

1. The award of premiums will be designated as follows: First premium, by a blue ribbon or card; the second premium by a red ribbon or card; third, by a white ribbon or card; and fourth by a yellow ribbon or card.

2. The Society reserves the right to withhold the premiums in every case in which it shall appear to the Executive Committee that the regulations have not been complied with, or that fraud or deception has been practiced or attempted.

3. Premiums are payable in cash. The medals and diplomas will be delivered by the Secretary as soon as possible after the Fair. Premiums will be paid by the Treasurer upon presentation of premium check drawn by the Secretary and countersigned by the President.

VII.—BOOTHS AND SHOWS.

When booths or grounds are leased, no admission tickets for lessees or assistants shall be given, nor shall any teams or employés with supplies be admitted between 8 A. M. and 6 P. M., during the Fair, without regular admission tickets.

VIII.—BILLS AND CLAIMS.

Persons having claims against the Society must present them to the Business

Committee before the close of the Fair. If there are any claims not then presented, they will not be acted upon until the annual meeting in January. No claims will be paid unless examined and certified to by the Business Committee, or a majority thereof.

IX.—LIQUORS.

No spirituous or intoxicating liquors shall be allowed to be sold on the Fair grounds during the Fair.

DEPARTMENT OF LIVE STOCK—SPECIAL RULES ON CATTLE.

Competition Open to the World.

That all exhibits in Divisions A, B, C, D, and E, must be owned by the exhibitor and in his possession at least three months previous to the Fair.

That all animals entered as thoroughbreds in Division A, shall be judged by a scale of points to be arranged under the direction of the Superintendent in charge of that department.

That the Superintendent of Division A shall appoint a Special Committee on Pedigrees.

That no animal entered as thoroughbred in Division A shall be admissible to the showing without a certificate of eligibility from the Committee on Pedigrees.

All entries of Cattle for exhibition shall be made on or before the Tuesday preceding the week of the Fair, and the full pedigrees of all animals entered shall accompany such entries, and the Secretary shall keep a file of all such pedigrees, each breed by itself, for the convenience of the Committee on Pedigrees. It is understood that in Shorthorns the American Shorthorn Herd Book, the English Shorthorn Herd Book, the Canada Herd Book, the Kentucky Shorthorn Herd Book, shall be considered the authority by which pedigrees shall be judged; in Devons, the American Devon Herd Book; Ayrshires, the North American Ayrshire Register and the American Breeder's Herd Book; the Jerseys, the American Jersey Cattle Club Herd Book Register. There being no standard herd books published for Herefords, Galloways and Holsteins, pedigrees of these breeds will be admitted at the discretion of the Committee on Pedigrees.

CATTLE.

In all cases of thoroughbred cattle, only those of approved pedigree will be permitted to compete. All animals of approved pedigree will be considered equal as to pedigree, no one strain of pure blood having preference over another in the prize ring.

All three year old heifers in the several classes of thoroughbred cattle as breeding stock shall be required to have borne a calf previous to the exhibition, or the heifer cannot compete.

Examination of cattle will take place on Tuesday from 1 o'clock P. M., and continue during the forenoon of Thursday, from 9 o'clock till 2 in the afternoon.

Bulls more than a year old must be secured by a ring in the nose, and otherwise secured to the satisfaction of the Superintendent, or they will be debarred from remaining on the ground.

DIVISION B—HORSES.

Competition Open to the World.

All entries in this Division must be made on or before the Tuesday previous to the Fair.

Horses to compete for premiums must be sound, except in cases of stallions or mares injured by accidents which do not impair them for usefulness.

Exhibitors of horses will be required to test the animals they may exhibit, under the direction of the several committees which may have charge of the class in which the entries are made. Strict obedience to the directions will be required, as the committee have full power to rule out of competition all who do not comply with their requirements.

Horses possessing no merit may be ordered off the grounds by the Superintendent.

The committee having charge of the exhibition of horses will have full possession and command of the track during the time of such exhibition, and marshals will be at their command for all purposes of order and enforcement of the rules.

All animals shown in this division must have been owned and in the possession of the exhibitor for three months previous to the entry for exhibition.

DIVISION C—SHEEP.

Competition Open to the World.

Sheep must, in all cases, have been evenly and closely shorn, not earlier than the twentieth of April before the Fair, and the date of shearing must be certified at the time of entry.

All ewes, three years old or over, except Class Fat Sheep, are required to have bred a lamb during the present year, and all sheep shall be entered and compete only in their respective classes. Pens shall consist of three in number, unless otherwise specified.

All entries in this division must be made on or before Tuesday of the week previous to the Fair.

All Sheep entered as thoroughbred American Merinos shall be registered, or be eligible to registry, in the Vermont, National, Ohio, or American Register.

All animals shown in this division must have been owned and in the possession of the exhibitor at least three months previous to the entry for exhibition.

DIVISION D—SWINE.

Competition Open to the World.

All animals shown in this division must have been owned and in the possession of the exhibitor at least three months previous to the entry for exhibition.

All entries in this division must be made before Tuesday previous to the Fair.

DIVISION E—POULTRY.

Competition Open to the World.

All animals shown in this division must have been owned and in possession of the exhibitor at least three months previous to the entry for exhibition.

All entries in this division must be made on or before Tuesday previous to the Fair.

Respectfully submitted.

WILLIAM BALL,
A. O. HYDE,
C. A. HARRISON,
Committee.

The report was adopted.

MISCELLANEOUS BUSINESS.

Mr. Smith was called to the chair, and, on motion of Mr. Phillips, the Secretary was instructed to purchase the current volumes of the Herd Books specified in the rules, and report in writing respecting such books at each annual winter meeting of the Executive Committee.

Mr. Kipp was excused from further attendance at this session.

On motion of Mr. Hanford, the rules and notes reported by the Committee on Premium List, not conflicting with the rules already reported by the Committee on Rules, were adopted.

On motion of Mr. Rising, the by-laws were adopted as published last year.

On motion of Mr. Fralick, the law passed by the Legislature last winter, relating to this Society, was ordered to be printed with the premium list.

Mr. Greene offered the following:

Resolved, That the resignation tendered to the Board by the honorable member from Oakland, viz.: H. A. Kipp, of Highland, was received with disappointment and regret, and that it was with great reluctance that we could sacrifice our wishes and resign ourselves to its acceptance, knowing full well that in so doing we were depriving ourselves, officially, of a genial friend and brother, and one whose courtesy, promptness and sound judgment would have been a great acquisition to this body, and at the same time an honor to the district he would have represented.

Resolved, That we extend to our brother our best wishes for his restoration to health, and a cordial invitation to meet with us, from time to time, that we may enjoy his social qualities and the wisdom of his counsel.

Adopted.

The President announced as the committee to act on an Educational Exhibit, in accordance with a resolution offered by Mr. Baxter, and adopted on the first evening, Ex-President W. L. Webber (appointed by said resolution), and Messrs. W. J. Baxter and F. V. Smith.

Mr. Parsons offered the following:

Resolved, That the thanks of the President and the Executive Committee of the State Agricultural Society be and they are hereby tendered to the Detroit Free Press Co., through Mr. Quinby, who so very courteously showed us through the labyrinth of that interesting establishment; to the Messrs. Pingree & Smith, where we passed an hour most delightfully in witnessing improved processes in boot and shoe manufacture; to the Board of Trade, at whose magnificent rooms we were cordially welcomed and most hospitably entertained; for all courtesies rendered; also to the reporters of the daily press, for their careful, complete and accurate reports of our daily proceedings.

Adopted.

On motion of Mr. Fralick, Mr. Parsons was added to the Special Committee to attend the convention of County Agricultural Societies, to be held at Ann Arbor on the 20th inst.

Mr. Baxter offered the following:

Resolved, That for the purpose of securing, if possible, favorable action on the preamble and resolution adopted by this committee in relation to membership in the National Association, Capt. Wm. A. Owen, of Detroit, a member of the National Association, be furnished with a certified copy of the preamble and resolution, and that he be requested to represent and act for this committee in the premises.

Adopted.

The Business Committee submitted the following supplemental report:

BUSINESS ORDERS.

1872, Amount of business orders at Kalamazoo	$4.885 08
1873, Amount of business orders at Grand Rapids	14,764 89
1874, Amount of business orders at East Saginaw	16.120 46
1875, Amount of business orders at East Saginaw	13,788 11
1876, Amount of business orders at Jackson	10,166 51
1877, Amount of business orders at Jackson	12.423 62
1878, Amount of business orders at Detroit	28,197 70
1879, Amount of business orders at Detroit	19,746 29

EXPENDED IN DETROIT.

1878, Buildings	$12,897 13	
1878, Fences, grounds, and water	2,079 61	
		$14,976 74
1879, Buildings	$4.212 92	
1879, Fences, grounds, and water	1,395 68	
		5,608 60
		$20,585 34
Total expense of building, at Detroit	17,110 05	
Total expense of fences, grounds, and water	3,475 29	
		$20,585 34

INVENTORY.

Buildings and Lumber (cost)	17,110 42	
Sundry fixtures	1,433 47	
		$18,543 89

Respectfully submitted.

J. M. STERLING,
A. O. HYDE,
F. M. MANNING,
Business Committee.

The report was accepted and adopted.

Mr. Baxter offered the following:

Resolved, That portions of the addresses of Presidents Webber and Phillips, referring to appointment of Judges on exhibits, and payment of their expenses, having been referred to the Business Committee, and such Committee having for want of time been unable to carefully consider and report definitely on the subject,

Resolved, That such Committee be instructed to digest a plan for the appointment of Judges by Superintendents in charge of Departments, and payment of expenses, to prepare rules and regulations, and that the same when so perfected be considered as the action of this Executive Committee, and be published in the premium list without further instructions.

Adopted.

Mr. Sterling moved that the Treasurer be authorized to employ a clerk in his discretion.

Mr. Ball moved to refer the motion to the Finance Committee.

Carried.

Mr. Fralick offered the following:

Resolved, That the salary of the Secretary for the ensuing year be fixed at the sum of $1,000, and that the year commence and end on the second Monday of January in each year.

Adopted.

The Secretary submitted the following:

To the President and Executive Committee of the State Agricultural Society:

The Secretary reports that there are now in his office 18 volumes of the American Shorthorn Herd Book; also, 6 volumes of the American Jersey Club Register, and 5 volumes of the English and American Devon Herd Book.

R. F. JOHNSTONE,
Secretary.

The report was adopted.

The Committee then took a recess until 1 : 30 P. M.

Afternoon Session.

The Executive Committee resumed its session, pursuant to adjournment, the President in the chair.

MISCELLANEOUS BUSINESS.

The Finance Committee presented the following:

To the President and Executive Committee of the State Agricultural Society:

Your Finance Committee to whom was referred the question of a clerk for the Treasurer, respectfully report: That in the judgment of your Committee, provision should be made for employing such help to aid the Treasurer in the discharge of his duties, and recommend that he be authorized to employ a book-keeper at a cost to the Society not exceeding $400 a year.

All of which is respectfully submitted.

HENRY FRALICK,
F. V. SMITH,
E. W. RISING,
Finance Committee.

The report was accepted and adopted.

On motion of Mr. Baxter, the Chairman of the Committee appointed to visit the Agricultural College, in 1879, was requested to prepare a written report and furnish the same for publication in the minutes of this Committee.

Mr. Fralick, from the Finance Committee, made the following report, which was accepted and adopted:

To the President and Executive Committee of the State Agricultural Society:

Your Finance Committee to whom was referred the bond of the Treasurer respectfully report that they have carefully examined the same, and find the bond in proper form and the sureties satisfactory, and recommend its acceptance.

All of which is respectfully submitted.

HENRY FRALICK,
F. V. SMITH,
E. W. RISING,
Finance Committee.

DETROIT, January 15, 1880.

The Business Committee presented the following:

To the President and Executive Committee of the State Agricultural Society:

Your Business Committee, to whom was referred that portion of the address of President Webber relative to the appointment of viewing committees and payment of their expenses, respectfully report that in their judgment the recommendations of the address should be adopted.

All of which is respectfully submitted.

J. M. STERLING,
A. O. HYDE,
F. M. MANNING,
Committee.

The report was accepted and adopted.

Mr. Greene moved that the Executive Committee meet at the Hudson House, Lansing, on the 9th of June, 1880, for the purpose of arranging to visit the Agricultural College on the succeeding day, and that the Secretary be directed to notify the members of the committee, the President of the College, and the representatives of the press who are now present at this meeting, and who are specially invited. Carried.

On motion of Mr. Baxter the matter of having an address at the next State Fair, or inviting distinguished guests to be present, was left to the President of the Society and the Business Committee, with power.

The President announced the following

STANDING COMMITTEES:

On Business and Transportation—Messrs. Sterling, Webber and Baxter.
On Finance—Messrs. Fralick, Gilbert and Rising.
On Premiums—Messrs. Wood. Kipp, Howard, Hanford, Burrington and Butterfield.
On Rules and Regulations—Messrs. Ball, Hyde and Harrison.
On Printing—Messrs. Humphrey, Dean and Hyde.
On Receptions—Messrs. Parsons, Shoemaker and Greene.
Programme—A. O. Hyde, W. H. Cobb and D. W. Howard.

EXECUTIVE SUPERINTENDENTS.

Cattle—D. W. Howard and I. H. Butterfield, Jr.
Horses—W. H. Cobb.
Sheep—J. Q. A. Burrington.
Swine—A. F. Wood.
Poultry—John McKay.
Miscellaneous—E. O. Humphrey.
Fine Arts—W. J. Baxter and C. A. Harrison.
Music—John Gilbert.
Children's Department—Mrs. General A. S. Williams and Miss Minnie Brow.
Manufactures—F. V. Smith.
Agriculture—Philo Parsons.
Machinery—E. M. Manning.
Farm Implements—H. O. Hanford and Abel Angel.
Dairy—Chas. Kipp.
Vehicles—Wm. Ball.

Forage—E. W. Rising.
Police—J. M. Sterling and Henry Fralick.
Gates and Gate Keepers—The Finance Committee.
General Superintendent—W. G. Beckwith.
Chief Marshal—A. O. Hyde.

The committee then adjourned *sine die*.

GEO. W. PHILLIPS, *President.*

R. F. JOHNSTONE, *Secretary.*

ELECTION OF OFFICERS.

In accordance with the By-Laws of the Michigan State Agricultural Society the annual election for officers was held on the Fair Grounds, in the city of Detroit, on Thursday, the 19th of September, 1879, Messrs. Adolf Wheeler, R. P. Clark, and F. Brinker being appointed the judges of said election:

Said judges at the close of said election made the following report:

Whole number of votes cast	145
FOR PRESIDENT.	
George W. Phillips, Romeo	144
FOR SECRETARY.	
R. F. Johnstone, Detroit	143
Frances W. Noble, Detroit	1
FOR TREASURER.	
A. J. Dean, Adrian	144
James H. Kelley	1
FOR MEMBERS OF EXECUTIVE COMMITTEE.	
Abel Angel, of Bradley	144
D. W. Howard, of Pentwater	144
H. O. Hanford, of Plymouth	144
F. M. Manning, of Albion	144
A. F. Wood, of Mason	144
F. V. Smith, of Coldwater	144
John Gilbert, of Ypsilanti	144
J. Q. A. Burrington, of Vassar	144
John McKay, of Cheboygan	144
C. A. Harrison, of Paw Paw	144

We hereby certify that the above named, who received the highest number of votes, are duly elected.

W. L. WEBBER, *President.*
ADOLF WHEELER, } *Judges.*
R. P. CLARK, }
F. BRINKER. }

PROCEEDINGS AT THE ANNUAL FAIR HELD SEPT. 17, 1879.

Detroit, Monday Evening, Sept. 15, 1879.

The Executive Committee met at the Russell House parlors at 7:30 P. M., and was called to order by President Webber.

The roll being called by the Secretary showed a quorum present.

Supt. Burrington of Division C, reported that the entries in his department were larger than at any previous Fair, and that there was a lack of accommodation for a number of sheep on the grounds for exhibition.

A debate on the state of affairs in this particular followed, during which it was stated that in some instances several entries had been made for a single prize by the same person, thus unnecessarily filling up the pens.

It was voted to erect 30, or a sufficient number more pens for the sheep, and hereafter to exclude any person making additional entries for one prize.

Supt. Wood of Division D reported that in his department the pens were mostly filled.

No reports were presented from the Superintendents of Divisions I, F, J, M, and N.

Superintendent of Division H reported that entries were still coming in in his department.

Superintendent of Division L reported that all space had been taken in his department.

The President stated that Philo Parsons, of Detroit, had secured Mrs. Geo. Williams, Miss Parsons, and Miss Brow to superintend Division O.

The President submitted communications which he had received from parties who had horses on the ground for exhibition, but who had failed through misunderstanding the rules to enter them in time, and asking leave to enter. These communications were from Hubbard & Bennett, of Jackson, and D. K. McElwain, of Hastings. The President further stated that he had received applications from parties in Canada, who after bringing stock here and finding they could not enter under the rules, asked that they be allowed to simply place their horses on exhibition.

It was moved that the first-named parties be allowed to enter, notwithstanding that the time for making such entries had passed.

The President gave it as his opinion that the rule of the Society regarding such matter could not be waived.

Mr. Fralick stated that according to his idea the rule as printed was not its real intention, and therefore the parties should not be excluded.

Mr. Hyde stated that parties who entered their stock in time, complain that those who enter at the last hour only do so, believing that they will carry off the largest premiums, after they have first looked over the field.

The motion was put to a vote and lost.

Upon the sggestion of Mr. Hyde, and motion of Mr. Beckwith, it was voted to allow the Canadian horses to remain on the ground for exhibition only.

The motion was subsequently amended so as to allow the other stock in question to be exhibited.

A communication was submitted by the President from a gentleman representing the Detroit Locomotive Works, asking for free admission for horse and buggy, on the grounds of his being lame.

Upon motion the matter was left to the Superintendent of the department in which the gentlemen had made his entries.

Announcement was made by the President of the annual election of officers of the Society to be held on Thursday.

The President appointed as judges of election, Messrs. W. S. Wilcox, of Adrian, Wm. Hamilton, of Flint, and Wm. Adair, of Detroit.

Mr. Parsons granted a request of the clerks in the various city offices for free admision tickets.

No action was taken in the matter.

Mr. Rising, superintendent of forage, asked instructions as to how much feed to furnish the stock on exhibition, stating that on the first day of the fair forty tons of hay and thirty tons of straw had been used.

After debate, the matter was left to him for action.

The President directed attention to an account for $10.00 by the Michigan Homestead for publishing notice of meeting held last winter, and which was laid over at the winter meeting.

The claim, upon motion, was allowed.

The place for holding the election was fixed at the same place as last year, and the appointment of a clerk for said election was, upon motion, left in the hands of the President.

Treasurer A. J. Dean presented a communication from the Fulton Iron Works, asking reduced rates for admitting their employés.

Upon motion the Treasurer was instructed to answer, "That granting the request would be inconsistent with the rules of the Society."

There being no other business the committee adjourned.

R. F. JOHNSTONE,
Secretary.

Detroit, Tuesday Evening, Sept. 16, 1879.

The Executive Committee met at the Russell House parlors at 7:30 P. M., and was called to order by President Webber.

The roll call showed a quorum present.

The minutes of the last meeting were read and approved.

A communication was received from Ambrose Purchase, protesting against the award of premiums made by the Viewing Committee in Class 13, Division "B," "horses of all work," on the ground that he made an entry in said class of a stallion colt, three years old, and the committee did not see him, as he took the animal back to his stable by order of the Superintendent, who subsequently failed to appear and examine the same on his merits.

After explanation by Supt. Hyde and Mr. Howard it was, on motion of Mr. Rising, resolved that the matter be referred to the Superintendent of the department in question, with full power to act.

The President submitted another communication from Messrs. Dewey & Stewart, protesting against the decision made by the Viewing Committee in Class 18, for the reason that the words "have made a season" are a technical error; that it is not expected that two-year-old stallions will make a season; that this rule, as construed by the judges, has not heretofore been enforced in a single instance; that that the rule as printed has heretofore been a silent or dead letter in this respect. They therefore ask a reconsideration of the decision.

Mr. Childs moved that inasmuch as the rule regarding the case has thus far been ignored it should henceforth be treated in a like manner.

The motion was adopted.

Upon motion of Mr. Parsons it was agreed that Mr. Sylvester Larned, who made an erroneous entry, should be allowed to change the same.

The meeting then adjourned.

R. F. JOHNSTONE, *Secretary.*

Detroit, Thursday Evening, September 18, 1879.

The Executive Committee met at the Russell House parlors at 7:30 P. M. President Webber in the chair.

Roll called: quorum present.

The minutes of last meeting were read and approved.

Protest of F. Noble, E. B. Donelson, and others, submitted and discussed and on motion was laid on the table.

The Secretary submitted the protest of L. C. Lincoln.

On motion the matter was referred to Superintendent in charge.

Protest of Edwin Phelps submitted. Referred to Superintendent in charge.

Protest of A. D. Powers, of Farmington. Referred to Superintendent in charge.

Protest of P. J. D. Van Dyke. Referred to Superintendent in charge.

Protest of Richle Brothers. Protest not entertained.

Protest of W. C. Kellogg, M. C. Knowles and others. Referred to Superintendent in charge.

Protest of Galtin Brothers, Detroit, submitted. Upon motion it was rejected.

Protest of Geo. L. Gibson & Co. submitted. Referred to Superintendent in charge.

Protest of A. Dondero, submitted. On motion, a premium of $3.00 was awarded him.

The Secretary submitted a communication from Secretary Garfield of the Pomological Society regarding exhibitors selling their wares in Pomological Hall.

On motion of Mr. Sterling the communication was placed on file. On motion of Mr. Childs the Finance Committee were authorized to settle with the Treasurer for all unsold tickets.

On motion of Mr. Childs the Finance Committee were instructed to count all tickets sold, settle with the Treasurer and destroy all tickets, if the count is essentially the same.

On motion of Mr. Parsons, the President was authorized to give Finance Committee all unused attendants' and meal tickets, and that they destroy them after giving account.

The committee then adjourned.

R. F. JOHNSTONE,
Secretary.

OFFICIAL LIST OF PREMIUMS AWARDED AT THE THIRTY-FIRST ANNUAL FAIR OF THE SOCIETY, HELD AT DETROIT, SEPTEMBER 17 TO 21, 1879.

DIVISION A—CATTLE.

CLASS 1.—SHORTHORNS.

Best bull 4 years old, Phelps Brothers, Dexter	$25 00
2d do., C. S. Brooks, Brighton	20 00
3d do., James Moore, Milford	15 00
4th do., R. A. Remick, Clarkston	10 00
Best bull 3 years old, D. S. Holcomb, Jackson	20 00
2d do., L. L. Brooks, Novi	15 00
3d do., Ed. McGonegal, Clarkston	10 00
4th do., F. M. Southwell, Allen	5 00
Best bull 2 years old, Geo. Fulton, Mt. Clemens	20 00
2d do., D. M. Uhl, Ypsilanti	15 00
3d do., Wm. Ball, Hamburg	10 00
4th do., W. & F. Warner, Dexter	5 00
Best bull 1 year old, Phelps Brothers, Dexter	15 00
2d do., D. McOmber, Hastings	10 00
3d do., G. A. Smith, Somerset	5 00
4th do., P. E. White, Northville	3 00
Best bull calf, W. & F. Warner, Dexter	12 00
2d do., Wm. Ball, Hamburg	8 00
3d do., A. F. Wood, Mason	5 00
4th do., D. M. Uhl, Ypsilanti	3 00
Best bull of any age, D. S. Holcomb, Jackson	Diploma
Best cow 4 years old, Phelps Brothers, Dexter	25 00
2d do., Amos F. Wood, Mason	20 00
3d do., Wm. Ball, Hamburg	15 00
4th do., W. C. Wixom, Wixom	10 00
Best heifer 3 years old, Phelps Brothers, Dexter	20 00
2d do., D. M. Uhl, Ypsilanti	15 00
3d do., Wm. Ball, Hamburg	10 00
4th do., D. M. Uhl, Ypsilanti	5 00
Best heifer 2 years old, W. C. Wixom, Wixom	20 00
2d do., D. S. Holcomb, Jackson	15 00
3d do., Phelps Brothers, Dexter	10 00
4th do., E. McGonegal, Clarkston	5 00
Best yearling heifer, Phelps Brothers, Dexter	15 00
2d do., D. M. Uhl, Ypsilanti	10 00
3d do., Phelps Brothers, Dexter	5 00
4th do., Wm. Ball, Hamburg	3 00
Best heifer calf, Phelps Brothers, Dexter	12 00
2d do., T. H. Lyon, Mason	8 00
3d do., Phelps Brothers, Dexter	5 00
4th do., A. F. Wood, Mason	3 00
Best bull with 4 of his get, Phelps Brothers, Dexter	20 00
Best cow and 3 of her progeny, D. S. Holcomb, Jackson	20 00

B. F. VANMETER,
I. H BUTTERFIELD,
E. BEMAN,
Viewing Committee.

CLASS 2—DEVONS.

Best bull 4 years old, E. T. Doney, "Victor," Jackson	$25 00
2d do., A. A. Sheldon, Midland City	20 00

Best bull 3 years old, P. K. Leech, Shelby	$20 00
2d do., Myron Bixby, Disco	12 00
Best bull 2 years old, A. J. Burrows, Troy	15 00
Best bull 1 year old, P. K. Leech, "Jingle," Shelby	10 00
Best bull calf, P. K. Leech, Shelby	7 00
2d do., A. A. Sheldon, Midland City	5 00
Best bull of any age, A. J. Burrows, Troy	Diploma
Best cow 4 years old, P. K. Leech, Shelby	25 00
2d do., A. J. Burrows, Troy	20 00
3d do., A. J. Burrows, Troy	10 00
Best heifer 3 years old, P. K. Leech, Shelby	20 00
2d do., Myron Bixby, Disco	12 00
Best heifer 2 years old, A. J. Burrows, Troy	15 00
2d do., A. J. Burrows, Troy	10 00
3d do., M. Bixby, Disco	5 00
Best yearling heifer, A. J. Burrows, Troy	10 00
2d do., M. Bixby, Disco	5 00
3d do., M. Bixby, Disco	3 00
Best heifer calf, P. K. Leech, Shelby	7 00
2d do., A. J. Burrows, Troy	5 00

B. F. VANMETER,
I. H. BUTTERFIELD,
E. BEMAN,
Viewing Committee.

CLASS 3—HEREFORDS.

Best bull 2 years old, Edwin Phelps, Pontiac	$15 00
Best bull 1 year old, David Clark, Lapeer	10 00
Best bull calf, Ed. Phelps, Pontiac	7 00
Best bull of any age, David Clark, Lapeer	Diploma
Best cow 4 years old, David Clark, Lapeer	25 00
2d do., Edwin Phelps, Pontiac	20 00
3d do., Edwin Phelps, Pontiac	10 00
Best heifer 3 years old, David Clark, Lapeer	20 00
Best heifer 2 years old, David Clark, Lapeer	15 00
2d do., Edwin Phelps, Pontiac	10 00
Best heifer 1 year old, David Clark, Lapeer	10 00
2d do., David Clark, Lapeer	5 00
Best heifer calf, Edwin Phelps, Pontiac	7 00
2d do., Edwin Phelps, Pontiac	5 00
3d do., Edwin Phelps, Pontiac	3 00

B. F. VANMETER,
I. H. BUTTERFIELD,
E. BEMAN,
Viewing Committee.

CLASS 4—AYRSHIRES.

Best bull 4 years old, Oliver W. Davenport, "Chester," Birmingham	$25 00
2d do., E. L. Lockwood, "Lear," Petersburg	20 00
Best bull 3 years old, 2d premium, Erwin Evelett, "Bumper," Corunna	12 00
Best bull 2 years old, Chas. R. Coryell, "Luxury," Jonesville	15 00
Best bull 1 year old, J. S. Rogers, Orchard Lake	10 00
Best bull calf, J. S. Rogers, Orchard Lake	7 00
Best bull of any age, E. L. Lockwood, Petersburg	Diploma
Best cow 4 years old, J. S. Rogers, "Nancy 2d," Orchard Lake	25 00
2d do., J. S. Rogers, "Madora," Orchard Lake	20 00
3d do., J. S. Rogers, "Jessie Graham," Orchard Lake	10 00
Best cow 3 years old, J. S. Rogers, "Bertha," Orchard Lake	20 00
Best heifer 1 year old, R. B. Caruss, "Lucy 3d," St. Johns	10 00
Best heifer calf, J. S. Rogers, "O. Lake Maid," Orchard Lake	7 00
2d do., J. S. Rogers, "Nanette 1st," Orchard Lake	5 00

W. H. ARNOLD,
W. J. G. DEAN,
JOHN PATON,
Viewing Committee.

CLASS 5—JERSEYS.

Best bull 4 years old, H. B. Fargo, "Rupee," Greenville	$25 00
Best bull 3 years old, Jno. G. English, Manchester	20 00
2d do., W. J. G. Dean, Hanover	12 00
Best bull 2 years old, N. W. Bates, Detroit	15 00
2d do., W. J. G. Dean, Hanover	10 00
3d do., H. J. Pingree, Detroit	5 00
Best bull 1 year old, W. J. G. Dean, Hanover	10 00
2d do., J. G. English, Manchester	5 00
3d do., Featherly & Marston, Bay City	3 00
Best bull calf, Jno. G. English, Manchester	7 00
Best bull of any age, Jno. G. English, Manchester	Diploma
Best cow 4 years old, Isaac Marston, Bay City	25 00
2d do., W. J. G. Dean, Hanover	20 00
3d do., M. W. Bates, Detroit	10 00
Best cow 3 years old, Jno. G. English, Manchester	20 00
2d do., W. J. G. Dean, Hanover	12 00
3d do., W. J. G. Dean, Hanover	8 00
Best heifer 2 years old, Jno. J. Bagley, Detroit	15 00
2d do., M. W. Bates, Detroit	10 00
3d do., H. P. Merrill, Bay City	5 00
Best heifer 1 year old, R. P. Gustin, Bay City	10 00
2d do., W. J. G. Dean, Hanover	5 00
3d do., W. J. G. Dean, Hanover	3 00
Best heifer calf, M. W. Bates, Detroit	7 00
2d do., W. J. G. Dean, Hanover	5 00
3d do., H. S. Pingree, Detroit	3 00

JAMES H. JEROME,
JAMES TAYLOR,
WILLIAM WHITFIELD,
Viewing Committee.

CLASS 6—GALLOWAYS.

Best bull 3 years old, R. B. Curuss, St. Johns	$20 00
Best bull one year old, Geo. Coleman, Marion	10 00
Best bull calf, R. B. Caruss, St. Johns	7 00
Best cow 4 years old, R. B. Caruss, St. Johns	25 00
2d do., R. B. Caruss, St. Johns	20 00
Best cow 3 years old, Geo. Colman, Marion	20 00
2d do., R. B. Caruss, St. Johns	12 00
Best heifer 2 years old, Geo. Colman, Marion	15 00
2d do., R. B. Caruss, St. Johns	10 00
Best heifer calf 1 year old, R. B. Caruss, St. Johns	10 00
2d do., Geo. Colman, Marion	5 00
3d do., Geo. Colman, Marion	3 00
Best calf, R. B. Caruss, St. Johns	7 00
2d do., R. B. Caruss, St. Johns	5 00
3d do., R. B. Caruss, St. Johns	3 00

ISRAEL V. SMITH,
JOHN PATON,
BYRON SUTHERLAND,
Viewing Committee.

CLASS 7—HOLSTEINS.

Best bull 4 years old, Wm. K. Green, Adrian	$25 00
2d do., Erwin Evelette, Corunna	20 00
Best bull 2 years old, A. Underwood, Rollin	15 00
Best bull 1 year old, E. R. Phillips, Bay City	10 00
2d do., Wm. A. Rowley, Mt. Clemens	5 00
3d do., Edwin Phelps, Pontiac	3 00
Best bull calf, Cole & Hawkins, Rollin	7 00
2d do., P. B. Richardson, Tuscola	5 00
3d do., P. B. Richardson, Tuscola	3 00
Best bull of any age, A. Underwood, Rollin	Diploma

Best cow 4 years old, Cole & Hawkins, Rollin	$25 00
2d do., P. B. Richardson, Tuscola	20 00
Best cow 3 years old, P. B. Richardson, Tuscola	20 00
Best heifer 2 years old, Wm. A. Rowley, Mt. Clemens	15 00
2d do., Cole & Hawkins, Rollin	10 00
3d do., P. B. Richardson, Tuscola	5 00
Best heifer calf 1 year old, Wm. Westover, Bay City	10 00
2d do., E. Phelps, Pontiac	5 00
3d do., Thomas McGraw, Bay City	3 00
Best heifer calf, Cole & Hawkins, Rollin	7 00

ISAAC MARSTON,
ISRAEL N. SMITH,
BYRON SUTHERLAND,
Viewing Committee.

CLASS 8—GRADE CATTLE.

Best grade or native cow 4 years old, A. Hosmer, North Farmington	$20 00
2d do., F. Wilson, Jackson	10 00
3d do., D. S. Holcomb, Jackson	5 00
Best heifer 3 years old, David Miller, Clarkston	15 00
2d do., R. A. Remick, Clarkston	7 00
3d do., C. J. Gregory, Dexter	4 00
Best heifer 2 years old, R. A. Remick, Clarkston	10 00
2d do., C. S. Gregory, Dexter	5 00
3d do., R. A. Remick, Clarkston	3 00
Best yearling heifer, David Miller, Clarkston	8 00
2d do. R. A. Remick, Clarkston	5 00
3d do., David Miller, Clarkston	3 00
Best heifer calf, R. A. Remick, Clarkston	5 00
2d do., David Miller, Clarkston	3 00
3d do., R. A. Remick, Clarkston	2 00
Best herd of grade cattle, R. A. Remick (Herd 1), Clarkston	20 00
2d do., R. A. Remick (Herd 2), Clarkston	10 00
3d do., David Miller, Clarkston	5 00

B. F. VANMETER,
I. H. BUTTERFIELD,
E. BEMAN,
Viewing Committee.

CLASS 9—WORKING OXEN AND STEERS.

Best yoke of working oxen 5 years old, David Miller, Clarkston	$20 00
2d do., Charles I. Wheleck, Salem	12 00
3d do., E. T. Doney, Jackson	10 00
Best yoke of steers 4 pears old, Amos F. Wood, Mason	15 00
2d do., E. T. Doney, Jackson	10 00
Best yoke of steers 3 years old, A. F. Wood, Mason	10 00
2d do., E. T. Doney, Jackson	7 00
Best yoke of steers 2 years old, A. Hosmer, N. Farmington	8 00
2d do., A. F. Wood, Mason	5 00
Best yoke of steers 1 year old, David Miller, Clarkston	6 00
2d do., A. F. Wood, Mason	4 00
3d do., A. Hosmer, N. Farmington	2 00
Best herd of 5 yoke of oxen and steers, Amos F. Wood, Mason	25 00

JOHN McKAY,
GUTHER PROCTOR,
JAMES CANFILD,
Viewing Committee.

CLASS 10—FAT CATTLE.

Best fat ox, Joseph England, Four Town	$15 00
2d do., Joseph England, Four Town	10 00
Best fat cow, P. E. White, Northville	15 00
2d do., Wm. Smith, Detroit	10 00
Best steer 3 years old, Williams & McGonegal, Clarkston	10 00
2d do., Williams & McGonegal, Clarkston	5 00

Best heifer 3 years old, Williams & McGonegal, Clarkston	$10 00
2d do., Wm. Smith, Detroit	5 00

I. H. BUTTERFIELD, Jr.,
A. S. BROOKS,
S. A. COLBY,
Viewing Committee.

CLASS 11.—HERDS.

Best herd of Shorthorns, Phelps Bros., Dexser	$60 00
2d do., D. S. Holcomb, Jackson	50 00
3d do., Phelps Bros., Dexter	40 00
4th do., Wm. Ball, Hamburg	30 00
5th do., D. M. Uhl, Ypsilanti	20 00
Best herd of Herefords, David Clark, Lapeer	40 00
Best herd of Jerseys, W. J. G. Dean, Hanover	40 00
2d do., W. J. G. Dean, Hanover	25 00
3d do., Marcus W. Bates, Detroit	15 00
Best herd of Galloways, P. B. Caruss, St. Johns	40 00
2d do., Geo. Colman, Marion	25 00

I. H. BUTTERFIELD, Jr.,
R. GIBSON.
C. C. BEAHAN,
Viewing Committee.

DIVISION B—HORSES.

CLASS 12—THOROUGHBREDS.

Best stallion, 4 years old, F. F. Chappell, "Gen. Custer," Mt. Clemens	$30 00
2d do., N. J. Custer, "Trogtoman," Monroe	20 00
Best stallion, 3 years old, J. B. Malcom, Lowell	20 00
Best stallion, 2 years old, F. F. Chappell, Mt. Clemens	12 00
Best brood mare 4 years old with foal, R. W. Brown, "Hat Brown," Royal Oak	20 00
2d do., R. W. Brown, "Queen of Diamonds"	15 00
Best mare 4 years old without colt, Dr. Jenner, Detroit	15 00

D. HORTON,
J. P. WETHERILL,
W. W. HODGE,
Viewing Committee.

CLASS 13—HORSES FOR ALL WORK.

Best stallion, 5 years old, Edward H. Lyon, St. Johns	$30 00
2d do., O. O. Gibbs, Vassar	20 00
3d do., Beers & Perkins, Owosso	10 00
4th do., C. F. Rhode, Oak, Wayne Co.	5 00
Best stallion, 4 years old, A. Headley, "Hero," Lansing	25 00
Best stallion, 3 years old, G. S. May, Unadilla	20 00
2d do., Wm. Butler, Mason	15 00
3d do., F. F., Humphrey, Saline	10 00
4th do., Ambrose Purchase, Auburn	5 00
Best stallion 2 years old, J. E. Rogers, Saline	12 00
2d do., W. W. Riggs, Sylvan Center	10 00
3d do., W. M. Baldwin, Watervliet	8 00
4th do., M. Green, Farmington	5 00
Best stallion, 1 year old, E. Woodman, Paw Paw	10 00
2d do., J. A. Kallenback, Sylvan Centre	8 00
3d do., Geo. Parrott, Mt. Clemens	5 00
4th do., John Brink, Lynn, St. Clair Co.	3 00
Best stallion colt, H. P. Merrill, Bay City	8 00
2d do., A. B. Donelson, Pontiac	5 00
3d do., J. D. Perry, Belle Branch	3 00
Best brood mare 4 years old with foal, H. P. Merrill, Bay City	20 00
2d do., H. P. Merrill	15 00
3d do., J. D. Perry, Belle Branch	10 00
4th do., A. B. Donelson, Pontiac	5 00

Best mare 4 years old without foal, J. C. Chilson, Livonia	$12 00
2d do., Frank Shaler, Grass Lake	8 00
3d do., R. G. McKee, Laingsburgh	5 00
Second best mare 3 years old, S. A. Grow	8 00
Best filly, 2 years old, Geo. Parrott, Mt. Clemens	8 00
2d do., Chas. Smith, Grass Lake	5 00
3d do., J. E. Rogers, Saline	3 00
4th do., H. B. Fargo, Greenville	2 00
Best filly 1 year old, W. M. Baldwin, Watervliet	7 00
2d do., Moses Mix, Owosso	5 00
3d do., Geo. Parrott, Mt. Clemens	3 00
Best filly colt, H. P. Merrill, Bay City	5 00
2d do., Geo. Parrot, Mt. Clemens	3 00
3d do., E. Woodman, Paw Paw	2 00
Best filly 3 years old. B. T. Ingalls, Almont	15 00
2d do., James Smith, Greenfield	10 00
Third best gelding, 4 years old, J. D. Perry, Belle Branch	5 00
Best gelding, 3 years old, J. C. Chilson, Livonia	10 00
2d do., H. A. Holcomb, Francisco	8 00
3d do., Abel Beers, Owosso	5 00
Best gelding, 2 years old. F. F. Humphrey, Saline	8 00
2d do., J. D. Perry, Belle Branch	5 00
2d do., H. A. Holcomb, Francisco	3 00
4th do., W. H. Hood, Springport	2 00
Best gelding 1 year old, Abel Beers, Owosso	6 00
Best pair matched horses 5 years old, Rufus K. Farnham, Almont	30 00
2d do., C. H. Hanchett, Flint	20 00
Best pair matched horses 4 years old, E. L. Slaght, Royal Oak	25 00
2d do., J. E. Curtis, Disco	15 00
3d do., Abel Beers, Owosso	10 00

N. HAMILTON,
W. W. MERRILL,
WM. JENNINGS,
Viewing Committee.

CLASS 14—ROADSTERS.

Best stallion, 5 years old, Dewey & Stewart, Owosso	$30 00
2d do., Henry Brown, Battle Creek	20 00
3d do., Samuel A. Brown, Pentwater	10 00
Best stallion. 4 years old, Dewey & Stewart, Owosso	25 00
2d do., Wm. Westover, Bay City	15 00
3d do., John T. Faxon, Lexington	10 00
Best stallion. 3 years old, J. J. Stellwagen, Wayne	20 00
2d do., Wm. W. Hayward, Battle Creek	15 00
3d do., Ray Warner, Coldwater	10 00
Best stallion. 2 years old, James Perry, Mt. Clemens	12 00
2d do., Dewey & Stewart, Owosso	8 00
3d do., M. L. Knowles, Coldwater	5 00
Best yearling stallion, Henry Brown, Battle Creek	10 00
2d do., Dewey & Stewart, Owosso	6 00
3d do., Herbert Lewis, Clarkston	4 00
Best colt, Dewey & Stewart, Owosso	7 00
2d do., N. M. Starkey, Fowlerville	5 00
3d do., A. B. Donelsod, Pontiac	3 00
Best gelding, 5 years old, A. C. Fisk, Coldwater	15 00
2d do., M. Green, Farmington	10 00
3d do., Frank Davenport, Grass Lake	5 00
Best gelding. 4 years old, J. P. Shoemaker, Amsden	12 00
Best gelding. 3 years old, Henry Brown, Battle Creek	10 00
2d do., M. L. Knowles, Coldwater	6 00
Best gelding, 2 years old. Alanson Strong, Grass Lake	8 00
2d do., Robert Gould, Ceresco	5 00
3d do., Abel Beers, Owosso	3 00
Best gelding. 1 year old, Abel Beers, Owosso	6 00
Best brood mare, 4 years old, with foal, Dewey & Stewart, Owosso	20 00
2d do., Robert Gould, Ceresco	15 00

3d best brood mare, A. B. Donelson, Pontiac	$10 00
Best mare, 4 years old, without colt, Dr. A. J. B. Jenner, Detroit	12 00
2d do., Samuel A. Brown, Pentwater	8 00
3d do., Samuel A. Brown, Pentwater	5 00
Best mare, 3 years old, Dewey & Stewart, Owosso	10 00
2d do., Thos. Foster, Flint	6 00
3d do., Dewey & Stewart, Owosso	4 00
Best mare, 2 years old, Robert Gould, Ceresco	8 00
2d do., James Perry, Mt. Clemens	5 00
3d do., M. E. Crofoot, Pontiac	3 00
Best mare, 1 year old, Dewey & Stewart, Owosso	7 00
2d do., Robt. Gould, Caresco	5 00
3d do., C. E. Ewers, Union City	2 00
Best colt, Robt. Gould, Ceresco	5 00
2d do., Dewey & Stewart, Owosso	3 00
3d do., W. W. Starkey, Fowlerville	2 00

J. W. PARKHURST,
JOHN T. BUTLER,
W. W. HODGE,
Viewing Committee.

CLASS 15—GENTS' DRIVING HORSES TO ROAD WAGON.

Best pair driving horses, Sumner Howard, Flint	$30 00
2d do., J. W. Hewett, Jackson	20 00
Best single gelding or mare, 5 years old, M. A. Hamilton, Detroit	30 00
2d do., Henry Brown, Battle Creek	20 00
3d do., W. A. Owen, Detroit	10 00
Best single gelding or mare, 4 years old, A. C. Fisk, Coldwater	20 00
2d do., M. L. Knowles, Coldwater	15 00
3d do., Donald MacLean, Ann Arbor	10 00

W. G. PATTINSON,
W. W. HODGE,
B. HORTON,
Viewing Committee.

CLASS 16—DRAUGHT HORSES.

Best stallion, 5 years old, H. P. Merrill, Bay City	$30 00
2d do., P. B. Richardson, Tuscola	20 00
3d do., Wm. H. Cook, Linden	10 00
Best stallion, 4 years old, G. M. Washburn, Lansing	25 00
Best stallion, 3 years old, J. T. Parker, Mt. Clemens	20 00
2d do., R. H. Hungerford, Concord	12 00
3d do., F. Johnson & Son, Grand Ledge	8 00
Best stallion, 2 years old, A. Brokins, Buchanan	10 00
2d do., R. H. Hungerford, Concord	6 00
Best colt, 1 year old, C. A. Harrison, Paw Paw	8 00
2d do., R. G. McKee, Laingsburg	5 00
Best suckling colt, Hiram B. Fargo, Greenville	5 00
Best draught mare, 4 years old, R. W. & T. Miller, Vassar	25 00
2d do., R. W. & T. Miller, Vassar	15 00
3d do., Isaac Rohrabacker, Laingsburg	10 00
Best mare, 2 years old, P. B. Richardson, Tuscola	10 00
2d do., Geo. Hanly, Buchanan	6 00
3d do., E. Woodman, Paw Haw	4 00
Best filly colt, I. Rohrabacker, Laingsburgh	5 00
2d do., Geo. Parrott, Mt. Clemens	3 00

H. C. SPENCER,
B. HORTON,
J. P. WITHERILL,
Viewing Committee.

CLASS 17—CARRIAGE AND BUGGY HORSES.

Best pair of matched carriage horses, 16 hands or over, and 5 years old, Yates S. Cole, Bellville	$30 00
2d do., J. A. Smith, Grass Lake	20 00

Best pair matched carriage horses, under 16 hands, four years old, C. E. Ewers, Union City	$30 00
2d do., James Osborn, Pontiac	20 00
3d do., Samuel P. St. John, Utica	10 00
Best pair matched carriage horses, 3 years old, Michael Greiner, Conner's Creek	20 00
2d do., A. P. Burr, Howell	12 00
3d do., E. L., Roberts, Marshall	8 00
Single carriage or buggy horse or mare, four years old, A. C. Fisk, Coldwater,	12 00
2d do., G. P. Linderman, Grand Ledge	8 00
3d do., E. C. Walker, Coldwater	4 00
Single carriage or buggy horse or mare, three years old, M. L. Knowles, Coldwater	10 00
2d do., W. H. Tousey, Bay City	7 00
3d do., W. S. Green, Farmington	3 00

W. G. PATTINSON,
J. R. CAMPBELL,
J. STARKWEATHER.

BOARD OF TRADE PREMIUMS.

Pair bay geldings, 5 years old, James Osborn, Pontiac, second premium	$25 00
Pair bay geldings, 4 years old, C. E. Ewers, Union City, first premium	50 00

ALEXANDER LEWIS,
R. W. GILLETT,
GEORGE SOWDEN,
Committee Board of Trade.

CLASS 18—BREEDERS' SPECIAL PREMIUMS.

Best roadster stallion, 5 years old, A. C. Jefferson, Fowlerville	$100 00
2d do., H. C. Merrill, Bay City	75 00
3d do., S. A. Grow, Greenville	50 00
Best roadster stallion, 4 years old, Sumner Howard, Flint	75 00
2d do., Dewey & Stewart, Owosso	50 00
Best roadster stallion, three years old, Ray Warner, Coldwater	30 00
2d do., I. P. Shoemaker, Amsden	20 00
3d do., C. B., Jones, Coldwater	10 00
Best roadster stallion, 2 years old, Henry Brown, Battle Creek	20 00
2d do., A. C. Fisk, Coldwater	15 00
3d do., M. L. Knowles, Coldwater	10 00

W. G. PATTINSON,
W. W. HODGE,
B. HORTON.

CLASS 17—MARES AND GELDINGS.

Best mare or gelding, 5 years old, Thompson & Hart, Lapeer	$100 00
2d do., H. P. Merrill, Bay City	75 00
3d do., A. C. Fisk, Coldwater	50 00
Best mare or gelding, 4 years old, A. C. Fisk, Coldwater	75 00
2d do., Wm. Conroy, Farmington	50 00
3d do., M. L. Knowles, Coldwater	25 00
Best mare or gelding, 3 years old, A. E. Howell, Homer	30 00
2d do., Thos, Foster, Flint	20 00
3d do., W. H. Towsey, Bay City	10 00
Best mare or gelding, 3 years old, M. E. Crofoot, Pontiac	20 00
2d do., O. E. Ewers, Union City	15 00
3d do., Ray Warner, Coldwater	10 00
Best thoroughbred stallion, any age, John F. Bower, Colon	75 00
2d do., J. B. Malcomb, Lowell	50 00
3d do., Wm. B. Drew, Birmingham	25 00
Best thoroughbred mare or gelding, over 3 years, F. F. Chappell, Mt. Clemens	50 00
2d do., J. B. Malcomb, Lowell	30 00
3d do., E. G. Miles, Fenton	20 00

W. G. PATTINSON,
GEO. H. SEELEY,
J. W. PARKHURST,
Viewing Committee.

Sweepstakes for stallions, S. A. Grow, Greenville, first premium	$50 00
2d do., Henry Brown, Battle Creek	30 00
3d do., Dewey & Stewart, Owosso	20 00

JOHN F. BUTTON,
J. W. PARKHURST,
W. W. HODGE,
Viewing Committee.

DIVISION C—SHEEP.

CLASS 21—THOROUGHBRED AMERICAN MERINOS.

Best ram, 2 years old, Wm. Ball, Hamburg	$20 00
2d do., D. P. Dewey, Grand Blanc	15 00
3d do., Kennedy & Wood, Liberty	10 00
4th do., J. S. Bamber, Highland	5 00
Best ram, 1 year old, Wm. Ball, Hamburg	15 00
2d do., J. & E. McHardy, Oceola Center	12 00
3d do., C. M. Fellows, Manchester	8 00
4th do., A. Diehl, Highland	4 00
Best 3 buck lambs, E. J. E. W. Hardy, Oceola Center	12 00
2d do., Wm. Ball, Hamburg	10 00
3d do., J. S. Bamber, Highland	5 00
4th 4o., D. P. Dewey, Grand Blanc	3 00
Best 3 ewes 2 years old, Jas. W. Dey, Deveraux	20 00
2d do., Wm. Ball, Hamburg	15 00
3d do., J. H. Thompson, Grand Blanc	10 00
4th do., D. P. Dewey, Grand Blanc	5 00
Best 3 ewes 1 year old, Wm. Hall, Hamburg	15 00
2d do., J. & E. McHardy, Oceola Center	12 00
3d do., Kennedy & Wood, Liberty	8 00
4th do., D. P. Dewey, Grand Blanc	4 00
Best 3 ewe lambs, E. J. & E. McHardy, Oceola Center	12 00
2d do., D. P. Dewey, Grand Blanc	10 00
3d do., Wm. Ball, Hamburg	5 00
4th do., J. H. Thompson, Grand Blanc	3 00

J. T. RICH,
R. B. CARUSS,
B. T. INGALLS,
Viewing Committee.

CLASS 22—AMERICAN MERINOS, INELIGIBLE TO REGISTRY.

Best ram 2 years old, H. R. Dewey, Grand Blanc	$15 00
2d do., H. Harper, Somerset	10 00
3d do., Jas. W. Dey, Deveraux	5 00
4th do., J. S. Bamber, Highland	3 00
Best ram 1 year old, D. P. Dewey, Grand Blanc	12 00
2d do., J. S. Bamber, Highland	8 00
3d do., P. W. Brown, Somerset	4 00
4th do., Van Gieson Bros., Clinton	2 00
Best 3 ram lambs, A. Diehl, Highland	10 00
2d do., Jas. W. Dey, Deveraux	5 00
3d do., Hood & Dow, Grass Lake	3 00
4th do., Van Gieson Bros., Clinton	2 00
Best 3 ewes 2 years old, D. P. Dewey, Grand Blanc	15 00
2d do., Jas. W. Dey, Deveraux	10 00
3d do., Hood & Dow, Grass Lake	5 00
4th do., W. J. Caruss, Union Home	3 00
Best 3 ewes 1 year old, Van Gieson Bros., Clinton	12 00
2d do., J. W. Dey, Deveraux	8 00
3d do., Frank Elmer, Deveraux	4 00
4th do., Hood & Dow, Grass Lake	2 00
Best 3 ewe lambs, Frank Elmer, Deveraux	10 00
2d do., A. Diehl, Highland	5 00

3d best 3 ewe lambs, Van Gieson Bros.	$3 00
4th do., Jas. W. Dey, Deveraux	2 00

J. T. RICH,
R. B. CARUSS,
B. T. INGALLS,
Viewing Committee.

CLASS 23—FINE WOOL GRADES.

Best 3 ewes 2 years old, T. H. Lyon, Mason	$12 00
2d do., J. S. Bamber, Highland	8 00
3d do., J. S. Bamber, Highland	5 00
Best 3 ewes 1 year old, J. S. Bamber, Highland	10 00
2d do., J. S. Bamber, Highland	6 00
3d do. C. S. Brooks, Brighton	4 00
Best 3 ewe lambs, Frank Elmer, Deveraux	8 00
2d do., H. R. Dewey, Grand Blanc	5 00
3d do., J. S. Bamber, Highland	3 00

J. H. THOMPSON,
J. S. WOOD,
G. V. A. N. GEISEN,
Viewing Committee.

CLASS 24—SOUTHDOWNS.

Best ram 2 years old, Mrs. Ann Newton, Pontiac	$15 00
2d do., Mrs. Ann Newton, Pontiac	10 00
3d do., Jno. Lessiter, Jersey	6 00
Best yearling ram, Moore & Kelley, Ypsilanti	12 00
2d do., P. Hagle, Pontiac	8 00
3d do., Jno. Lessiter, Jersey	5 00
Best pen of ram lambs, Jno. Lessiter, Jersey	10 00
2d do., Moore & Kelley, Ypsilanti	6 00
Best 3 ewes 2 years old, Peter Hagle, Pontiac	15 00
2d do., Mrs. Ann Newton, Pontiac	10 00
3d do., Jno. Lessiter, Jersey	6 00
Best 3 ewes 1 year old, Jno. Lessiter, Jersey	12 00
2d do., Jno. Lessiter, Jersey	8 00
3d do., Jno. Lessiter, Jersey	5 00
Best 3 ewe lambs, Jno. Lessiter, Jersey	10 00
2d do., Jno. Lessiter, Jersey	6 00
3d do., Jno. Lessiter, Jersey	4 00

ROB'T MILLER,
WM. WHITE,
MARK HAGLE,
Viewing Committee.

CLASS 25—ALL MIDDLE WOOL SHEEP OTHER THAN SOUTHDOWNS.

Best ram 2 years old, Mrs. Ann Newton, Pontiac	$15 00
2d do., Moore & Kelly, Ypsilanti	10 00
3d do., Mrs. Ann Newton Pontiac	6 00
Best yearling ram, Mrs. Ann Newton, Pontiac	12 00
2d do., Mrs. Ann Newton, Pontiac	8 00
3d do., Mrs. Ann Newton, Pontiac	5 00
Best pen of ram lambs, Moore & Kelly, Ypsilanti	10 00
2d do., Moore & Kelly, Ypsilanti	6 00
Best 3 ewes 3 years old, Mrs. Ann Newton, Pontiac	15 00
2d do., Moore & Kelly, Ypsilanti	10 00
3d do., Mrs. Ann Newton, Pontiac	6 00
Best 3 ewes 1 year, Moore & Kelly, Ypsilanti	8 00
2d do., Mrs. Ann Newton, Pontiac	8 00
3d do., Moore & Kelly, Ypsilanti	5 00
Best 3 ewe lambs, Moore & Kelly, Ypsilanti	10 00
2d do., Mrs. Ann Newton, Pontiac	6 00
3d do., Moore & Kelly, Ypsilanti	4 00

ROB'T MILLER,
WM. WHITE,
MARK HAGLE,
Viewing Committee.

CLASS 26—LEICESTERS.

Best ram 2 years old, Mrs. Ann Newton, Pontiac	$15 00
2d do., Amos F. Wood, Mason	10 00
3d do., Amos F. Wood, Mason	6 00
Best yearling ram, Hugh McDonald, Horton	12 00
2d do., Amos F. Wood, Mason	8 00
3d do., Amos F. Wood, Mason	5 00
Best pen of ram lambs, Mrs. Ann Newton, Pontiac	10 00
2d do., Amos F. Wood, Mason	6 00
Best 3 ewes 3 years old, A. F. Wood	15 00
2d do., Mrs. Ann Newton, Pontiac	10 00
3d do., A. F. Wood, Mason	6 00
Best 3 ewes 1 year old, H. McDonald, Horton	12 00
2d do., Mrs. Ann Newton, Pontiac	8 00
3d do., A. F. Wood, Mason	5 00
Best 3 ewe lambs, A. F. Wood, Mason	10 00
2d do., H. McDonald, Horton	6 00
3d do., A. F. Wood, Mason	4 00

ROB'T MILMER,
WM. WHITE,
MARK HAGLE,
Viewing Committee.

CLASS 27—COTSWOLD AND OTHER LONG WOOLED SHEEP.

Best ram 2 years old, Frank Wilson, Jackson	$15 00
2d do., H. McDonald, Horton	10 00
3d do., Jas. Bunker, Owosso	6 00
Best yearling ram, H. McDonald, Horton	12 00
2d do., H. McDonald, Horton	8 00
3d do., Jas. Bunker, Owosso	5 00
Best pen of 3 ram lambs, F. Wilson, Jackson	10 00
2d do., H. McDonald, Horton	6 00
3d do., H. McDonald, Horton	4 00
Best 3 ewes, 2 years old, F. Wilson, Jackson	15 00
2d do., H. McDonald, Horton	10 00
3d do., Mrs. Ann Newton, Pontiac	6 00
Best 3 ewes 1 year old, H. McDonald, Horton	12 00
2d do., F. Willson, Jackson	8 00
3d do., H. McDonald, Horton	5 00
Best 3 ewe lambs, H. McDonald, Horton	10 00
2d do., F. Willson, Jackson	6 00
3d do., James Bunker, Owosso	4 00

ROB'T MILLER,
WM. WHITE,
MARK HAGLE,
Viewing Committee.

CLASS 28—GRADE COARSE WOOLED EWES.

Best 3 ewes 2 years old, H. McDonald, Horton	$12 00
2d do., Wm. Smith, Detroit	8 00
3d do., Mrs. Ann Newton, Pontiac	5 00
Best 3 ewes 1 year old, Moore & Kelly, Ypsilanti	10 00
2d do., Moore & Kelly, Ypsilanti	6 00
Best 3 ewe lambs, Moore & Kelly, Ypsilanti	8 00
2d do., Mrs. Ann Newton, Pontiac	5 00

ROB'T MILLER,
WM. WHITE,
MARK HAGLE,
Viewing Committee.

CLASS 29—FAT SHEEP.

Best pen middle wooled sheep, Mrs. Ann Newton, Pontiac	$12 00
2d do., Mrs. Ann Newton, Pontiac	8 00
3d do., Jno. Lessiter, Jersey	5 00

Best pen long wooled sheep, Mrs. Ann Newton, Pontiac	$12 00
2d do., F. Willson, Jackon	8 00
3d do., H. McDonald, Horton	5 00
Best pen grade fat sheep, Mrs. Ann Newton, Pontiac	12 00
2d do., Moore & Kelly, Ypsilanti	8 00
3d do., Wm. Smith, Detroit	5 00

ROB'T MILLER,
WM. WHITE,
MARK HAGLE,
Viewing Committee.

DIVISION D—SWINE.

CLASS 30—BERKSHIRES.

Best boar 2 years old, Wm. Smith, Detroit	$12 00
2d do., N. A. Clapp, Wixom	8 00
3d do., Wm. Smith, Detroit	4 00
Best boar 1 year old, W. A. Rowley, Mt. Clemens	10 00
2d do., Wm. Smith, Detroit	6 00
3d do., R. B. Gustin, Bay City	3 00
Best brood sow 2 years old, D. F. Vickery, Charlotte	12 00
2d do., Wm. Smith, Detroit	8 00
3d do., W. A. Rowley, Mt. Clemens	4 00
Best sow 1 year old, Wm. Smith, Detroit	10 00
2d do., J. C. Chilson, Livonia	6 00
3d do., R. P. Gustin, Bay City	3 00
Best pen of pigs, J. C. Chilson, Livonia	10 00
2d do., D. F. Vickery, Charlotte	6 00
3d do., N. A. Clapp, Wixom	3 00
Best boar of any age, Wm. Smith, Detroit	Diploma

ESSEX.

Best boar, 2 years old, Wm. Smith, Detroit	$12 00
2d do., Frank Willson, Jackson	8 00
3d do.. E. T. Doney, Jackson	4 00
Best boar, 1 year old, Wm. Smith, Detroit	10 00
2d do., Amos F. Wood, Mason	6 00
3d do., E. T. Doney, Jackson	3 00
Best brood sow, 2 years old, E. W. Cottrell, Greenfield	12 00
2d do., Wm. Smith, Detroit	8 00
3d do., Amos F. Wood, Mason	4 00
Best sow, 1 year old, Frank Willson, Jackson	10 00
2d do., Wm. Smith, Detroit	6 00
3d do., Wm. Smith, Detroit	3 00
Best pen of pigs, Wm. Smith, Detroit	10 00
2d do., Amos F. Wood, Mason	6 00
3d do., R. B. Caruss, St. Johns	3 00
Best boar of any age, Wm. Smith, Detroit	Diploma

GEORGE D. BOYCE,
MILTON J. GARD,
Viewing Committee.

SUFFOLKS.

Best boar, 2 years old, Terry Gates, Greenfield	$12 00
2d do., Frank Willson, Jackson	8 00
3d do., Wm. Smith, Detroit	4 00
Best boar, 1 year old, Wm. Smith, Detroit	10 00
2d do., Frank Willson, Jackson	6 00
3d do., D. F. Vickery, Charlotte	3 00
Best brood sow, 2 years old, E. W. Cottrell, Greenfield	12 00
2d do., Wm. Smith, Detroit	8 00
3d do., Frank Willson, Jackson	4 00
Best sow, 1 year old, Wm. Smith, Detroit	10 00
2d do., E. W. Cottrell, Greenfield	6 00
3d do., D. F. Vickery, Charlotte	3 00

Best pen of pigs, Frank Willson, Jackson	$10 00
2d do., D. F. Vickery, Charlotte	6 00
3d do., Wm. Smith, Detroit	3 00

POLAND-CHINA.

Best boar, 2 years old, R. H. Hungerford, Concord	12 00
2d do., R. M. Cross, Ovid	8 00
Best boar, 1 year old, Asa A. Sheldon, Midland City	10 00
2d do., R. H. Hungerford, Concord	6 00
3d do., Asa A. Sheldon, Midland City	3 00
Best sow, 2 years old, R. M. Cross, Ovid	12 00
2d do., R. H. Hungerford, Concord	8 00
Best sow, 1 year old, R. H. Hungerford, Concord	10 00
2d do., Asa A. Sheldon, Concord	3 00
Best pen of pigs, R. M. Cross, Ovid	10 00
2d do., R. M. Cross, Ovid	6 00
3d do., R. H. Hungerford, Concord	3 00
Best boar of any age, R. H. Hungerford, Concord	Diploma

FAT PIGS.

Best hog over 1 year old, Wm. Smith, Detroit	10 00
2d do., Wm. Smith, Detroit	6 00
3d do., Frank Willson, Jackson	3 00
Best pig less than 10 months old, Frank Willson, Jackson	6 00
2d do., Wm. Smith, Detroit	4 00
3d do., R. H. Hungerford, Concord	2 00

GEO. D. BOYCE,
MILTON J. GARD,
Viewing Committee.

CHESTER WHITE.

Best boar, 1 year old, W. C. Wixom, Wixom	10 00
2d do., T. J. Strong, Monterey	6 00
3d do., T. J. Strong, Monterey	3 00
Best brood sow, 2 years old, W. C. Wixom, Wixom	12 00
2d do., T. J. Strong, Monterey	8 00
3d do., T. J. Strong, Monterey	4 00
Best sow, 1 year old, W. C. Wixom	10 00
2d do., W. C. Wixom, Wixom	6 00
3d do., T. J. Strong, Monterey	3 00
Best pen of pigs, W. C. Wixom, Wixom	10 00
2d do., W. C. Wixom, Wixom	6 00
3d do., T. J. Strong, Monterey	3 00
Best boar of any age, W. C. Wixom, Wixom	Diploma

JOHN LESSITER,
GEO. D BOYCE,
MILTON J. GARD,
Viewing Committee.

DIVISION E—POULTRY.

CLASS 31.

Best collection of poultry, Hayes & McElwain, Hastings	$15 00
2d do., Curtis, Clark & Co., Monroe	10 00

ASIATIC.

Fowls.

Best pair of light brahmas, H. H. Leuntz, Adrian	2 00
2d do., Curtis, Clark & Co., Monroe	1 00
Best pair dark brahmas, Hayes & McElwayn, Hastings	2 00
2d do., W. A. Holcomb, Francisco	1 00
Best pair buff cochins, Oscar Doolittle, Adrian	2 00
2d do., Oscar Doolittle, Adrian	1 00
Best pair partridge or grouse cochins, W. S. Jones, Owosso	2 00
2d do., Hayes & McElwain, Hastings	1 00

Best pair white cochins, W. A. Holcomb, Francisco	$2 00
2d do., Hayes & McElwain, Hastings	1 00
Best pair black cochins, Andrew Burger, Adrian	2 00

Chickens.

Best pair light brahmas, Curtis, Clark & Co., Monroe	2 00
2d do.. T. H. Lyon, Mason	1 00
Best pair dark brahmas, Hayes & McElwain, Hastings	2 00
2d do. Hayes & McElwain, Hastings	1 00
Best pair buff cochins, Oscar Doolittle, Adrian	2 00
2d do., Oscar Doolittle, Adrian	1 00
Best pair partridge or grouse cochins, Hayes & McElwain, Hastings	2 00
2d do., W. S. Jones, Owosso	1 00
Best pair white cochins, Hayes & McElwain, Hastings	2 00
2d do., Hayes & McElwain. Hastings	1 00
Best pair black cochins, Andrew Burger, Adrain	2 00
2d do., Hayes & McElwain, Hastings	1 00

DORKING.

Fowls.

Best pair white dorkings, Hayes & McElwain, Hastings	2 00
2d do., Hayes & McElwain, Hastings	1 00
Best pair dominiques, W. S. Jones, Owosso	2 00

Chickens.

Best pair white dorkings, Hayes & McElwain, Hastings	2 00
2d do., Hayes & McElwain, Hastings	1 00
Best pair dominiques, W. S. Jones, Owosso	2 00

AMERICAN.

Fowls.

Best pair Plymouth rocks, Ambrose Purchase, Auburn	2 00
2d do., W. A. Holcomb, Francisco	1 00

Chickens.

Best pair Plymouth rocks, Curtis, Clark & Co., Monroe	2 00
2d do., Curtis, Clark & Co., Monroe	1 00

GAME.

Fowls.

Best pair black breasted red games, Curtis, Clark & Co., Monroe	2 00
2d do., F. C. Whitney, Detroit	1 00
Best pair duck wing games, Curtis, Clark & Co., Monroe	2 00
2d do., Curtis, Clark & Co., Monroe	1 00
Best pair blue games, Curtis, Clark & Co., Monroe	1 00

Chickens.

Best pair black breasted red games, Curtis, Clark & Co., Monroe	2 00
2d do., Curtis, Clark & Co., Monroe	1 00
Best pair duck wing games, Curtis, Clark & Co., Monroe	2 00
2d do., Curtis, Clark & Co., Monroe	1 00
Best pair blue games, Curtis, Clark & Co., Monroe	1 00

SPANISH.

Fowls.

Best pair black Spanish, Hayes & McElwain, Hastings	2 00
2d do., W. A. Holcomb, Francisco	1 00
Best pair brown leghorns, Gay & Holton, Detroit	2 00
2d do., Curtis, Clark & Co., Monroe	1 00

Chickens.

Best pair black Spanish, W. A. Holcomb, Francisco	2 00
2d do., W. A. Clark & Co., Detroit	1 00
Best pair white leghorns, Gay & Holton, Detroit	1 00
2d do., Curtis, Clark & Co., Monroe	1 00
Best pair brown leghorns, W. H. Clark & Co., Detroit	2 00
2d do., Ambrose Purchase, Auburn	1 00

POLISH.

Fowls.

Best pair black Polish, F. C. Whitney, Detroit	$2 00
2d do., Ambrose Purchase, Auburn	1 00
Best pair white Polish, Fisher & Hammond, Ann Arbor	2 00
Best pair silver Polish, Ambrose Purchase, Auburn	2 00
2d do., Ambrose Purchase, Auburn	1 00
Best pair golden Polish, W. A. Holcomb, Francisco	2 00
2d do., F. C. Whitney, Detroit	1 00

Chickens.

Best pair black Polish, Fisher & Hammond, Ann Arbor	2 00
2d do., Fisher & Hammond, Ann Arbor	1 00
Best pair white Polish, Fisher & Hammond, Ann Arbor	2 00
Best pair silver Polish, Ambrose Purchase, Auburn, second premium	1 00

FRENCH.

Fowls.

Best pair Houdans, Fisher & Hammond, Ann Arbor	2 00
Ambrose Purchase, Auburn	1 00

Chickens.

Best pair Houdans, Fisher & Hammond, Ann Arbor	2 00

HAMBURGS.

Fowls.

Best pair golden spangled Hamburgs, Hayes & McElwain, Hastings	2 00
Best pair silver spangled Hamburgs, Hayes & McElwain, Hastings	2 00

Chickens.

Best pair golden spangled Hamburgs, Hayes & McElwain, Hastings	2 00
2d do., Hayes & McElwain, Hastings	1 00
Best pair silver spangled Hamburgs, W. H. Clark & Co., Detroit	2 00
2d do., Curtis & Co., Monroe	1 00

MISCELLANEOUS.

Fowls.

Best pair silkies, Fisher & Hammond, Ann Arbor	2 00

Chickens.

Best pair silkies, Fisher & Hammond, Ann Arbor	2 00
2d do., Fisher & Hammond, Ann Arbor	1 00

BANTAMS.

Fowls.

Best pair Black breasted game bantams, Hayes & McElwain, Hastings	2 00
2d do., Curtis, Clark & Co., Monroe	1 00
Best pair duckwing game bantams, Curtis, Clark & Co., Monroe	2 00
2d do., F. C. Whitney, Detroit	1 00
Best pair silver-laced seabright bantams, Hayes & McElwain, Hasting	2 00
2d do., Fisher & Hammond, Ann Arbor	1 00
Best pair white bantams, W. S. Jones, Owosso	2 00
Best pair gold-laced seabright bantams, Hayes & McElwain, Hastings	2 00
2d do., F. A. Cadwell, Jr., Detroit	1 00
Best pair black African bantams, Hayes & McElwain, Hastings	2 00
2d do., C. M. Page, South Litchfield	1 00

Chickens.

Best pair black breasted red game bantams, Hayes & McElwain, Hastings	2 00
2d do., Curtis, Clark & Co., Monroe	1 00
Best pair duckwing game bantams, Curtis, Clark & Co., Monroe	2 00
2d do., F. C. Whitney, Detroit	1 00
Best pair white bantams, W. S. Jones, Owosso	2 00

TURKEYS.

Best pair white turkeys, Ambrose Purchase, Auburn	2 00
2d do., W. A. Holcomb, Francisco	1 00
Best pair pearl Guinea fowls, W. A. Holcomb, Francisco	2 00
2d do., W. A. Holcomb, Francisco	1 00

Best white Guinea fowls, Ambrose Purchase, Auburn	$2 00
2d do., Ambrose Purchase, Auburn	1 00

ORNAMENTAL CLASS.

Best pair pea fowls, W. A. Holcomb, Francisco	2 00

GOOSE CLASS.

Best pair Toulouse geese, Ambrose Purchase, Auburn	2 00
2d do., C. M. Page, South Litchfield	1 00
Best pair Bremen geese, Ambrose Purchase, Auburn	2 00
2d do., Ambrose Purchase, Auburn	1 00
Best pair white Chinese geese, W. A. Holcomb, Francisco	2 00
2d do., Ambrose Perchase, Auburn	1 00
Best pair common geese, Mrs. M. Leslie, Dearborn	2 00

DUCK CLASS.

Best pair Rouen ducks, W. H. Clark & Co., Detroit	2 00
2d do., Ambrose Purchase, Auburn	1 00
Best pair Aylesbury ducks, W. A. Holcomb, Francisco	2 00
2d do., C. M. Page, South Litchfield	1 00
Best pair Cayuga ducks, Ambrose Purchase, Auburn	2 00
2d do., Andrew Burger, Adrian	1 00
Best pair topknot ducks, Fisher & Hammond, Ann Arbor	2 00
2d do., Mrs. M. Leslie, Dearnborn	1 00
Best pair Pekin ducks, Hayes & McElwain, Hastings	2 00
Best pair Muscovy ducks, W. A. Holcomb, Francisco, second premium	1 00

RABBIT CLASS.

Best pair lop-eared rabbits—buck, John Potter, Detroit Junc., Springwells.	2 20
2d do., John Potter, Detroit Junction, Springwells	1 00
Best pair lop-eared rabbits, doe, John Potter, Detroit Junc., Springwells,	2 00
2d do., John Potter, Detroit Junction, Springwells	1 00
Best pair white silk-haired rabbits, Fisher & Hammond, Ann Arbor	2 00
2d do., Fiser & Hammond, Ann Arbor	1 00
Best pair common rabbits, Fisher & Hammond, Ann Arbor	2 00
2d do., W. A. Holcomb, Francisco	1 00

PIGEONS.

Best collection of pigeons, W. S. Jones, Owosso	5 00
2d do., Curtis, Clark & Co., Monroe	3 00

CAGE BIRDS.

Canaries—best pair Belgian	no award
2d do.—German, Mrs. E. Whittaker, Northville	$2 00

MINOR PET CLASS.

Best pair guinea pigs, Edward Sterling, Detroit	2 00
Best specimen squirrels, F. C. Whitney, Detroit	2 00
Best pair of ferrets, Fisher & Hammond, Ann Arbor	2 00

STUFFED BIRDS.

Best collection, G. W. Chambers, North Adams	10 00
2d do., Mummery & Co., Detroit	5 00

W. H. TODD,
Viewing Committee.

DIVISION F.—FARM AND GARDEN PRODUCE.

CLASS 32—GRAIN AND SEEDS.

Best bushel winter red wheat, H. D. Platt, Ypsilanti	$6 00
2d do., Wm. Hall, Greenfield	4 00
Best bushel winter white wheat, H. E. Bidwell, Plymouth	6 00
2d do., H. R. Dewey, Grand Blanc	4 00
Best bushel spring wheat, O. E. Reynolds, Harrisville	5 00
2d do., D. Geddes, East Saginaw	3 00
Best bushel of rye, J. F. Stabler, Ann Arbor	5 00
2d do., H. E. Bidwell, Plymouth	3 00
Best bushel four-rowed barley, D. Geddes, Saginaw City	5 00
2d do., E. E. Duncan & Co., Detroit	3 00

Best bushel of oats, E. H. Wurts, East Saginaw	$5 00
2d do., A. J. Burrows, Troy	3 00
Best bushel of winter barley, D. Woodman, Paw Paw	5 00
2d do., H. E. Bidwell, Plymouth	3 00
Best bushel of dent corn, in ear, H. E. Bidwell, Plymouth	5 00
2d do., J. F. Habler, Ann Arbor	3 00
Best bushel flint corn, in ear, H. E. Bidwell, Plymouth	5 00
2d do., Wm. B. Phelps, Big Beaver	3 00
Best bushel other variety of corn, Thos. Langley, Greenfield	5 00
2d do., Geo. Ford, Dearborn	3 00
Best bushel of peas, G. W. Prescott, Grand Rapids	5 00
2d do., G. W. Prescott, Grand Rapids	3 00
Best bushel of white beans, David Woodman, Paw Paw	5 00
2d do., R. M. Webster, Armada	3 00
Best bushel large clover seed, G. W. Prescott, Grand Rapids	5 00
2d do., David Geddes, Saginaw City	3 00
Best bushel small clover seed, G. W. Prescott, Grand Rapids	5 00
2d do., J. M. Blowers, Lawrence	3 00
Best bushel timothy seed, G. W. Prescott, Grand Rapids	5 00
2d do., R. W. Webster, Armada	3 00
Best bushel of buckwheat, G. W. Prescott, Grand Rapids	3 00
2d do., James M. Hill, Ann Arbor	2 00
Best sample of hops, H. D. Cutting, Clinton	2 00
Best bushel of seed—new variety grass, H. D. Cutting, Clinton	2 00
Best exhibition field seeds, David Woodman, Paw Paw	10 00
Best assortment garden seeds, W. L. Walters, Utica	10 00
Best display and collection of the several kinds of grain in heads, arranged and named, David Woodman, Paw Paw	10 00
2d do., G. W. Prescott, Grand Rapids	5 00
Best display of a collection of the several kinds of grain heads, with stool and roots entire, accompanied by the berry, and with samples of its flour, David Woodman, Paw Paw	10 00
2d do., A. B. Travis, Brandon	5 00
Best display and collection of corn in the ear, David Woodman, Paw Paw	10 00
2d do., H. B. Chapman, Reading	5 00

H. P. MERRILL,
J. C. DAYTON,
J. P. WETHERILL,
Viewing Committee.

CLASS 33—ROOTS AND VEGETABLES.

Best display of roots and vegetables, E. H. Wurts, East Saginaw	$12 00
2d do., David Geddes, Saginaw City	10 00
3d do., C. Van Haaften, Kalamazoo	5 00
Best 3 varieties of early potatoes, W. L. Walters, Utica	3 00
2d do., C. Van Haaften, Kalamazoo	2 00
Best 3 varieties of late potatoes, D. Geddes, Saginaw City	3 00
2d do., H. B. Chapman, Reading	2 00
Best sample of early late potatoes, D. Geddes, Saginaw City	3 00
2d do., Charles Lerchen, Greenfield	2 00
Best samples of late potatoes, C. Van Haaften, Kalamazoo	3 00
2d do., E. H. Wurts, East Saginaw	2 00
Best sample of sweet potatoes, H. B. Chapman, Reading	3 00
2d do., E. H. Wurts, East Saginaw	2 00
Best dozen of blood beets, Steve Marx, 1st Gratiot toll gate	2 00
2d do., H. C. Engle, Detroit	1 00
Best dozen of turnip beets, H. C. Engel, Detroit	2 00
2d do., E. H. Wurts, East Saginaw	1 00
Best dozen of sugar beets, E. H. Wurts, East Saginaw	2 00
2d do., D. Geddes, Saginaw City	1 00
Best dozen of white or yellow beets, E. H. Wurts, East Saginaw	2 00
2d do., C. Van Haaften, Kalamazoo	2 00
Best dozen of beets for table use, E. H. Wurts, East Saginaw	2 00
2d do., D. Geddes, Saginaw City	1 00
Best collection of 5 kinds of beets, E. H. Wurts, East Saginaw	3 00
2d do., C. Van Haaften, Kalamazoo	2 00

Best dozen of mangel wurtzel, E. H. Wurts, East Saginaw	$2 00
2d do., Steve Marx, 1st Gratiot Toll Gate	1 00
Best dozen of orange carrots, D. Geddes, Saginaw City	2 00
2d do., Stephen Marx, 1st Gratiot Toll Gate	1 00
Best dozen of white carrots, D. Geddes, Saginaw City	2 00
2d do., C. Van. Haaften, Kalamazoo	1 00
Best dozen of any other kinds of carrots, C. Van Haaften, Kalamazoo	2 00
2d do., S. Marx, 1st Gratiot Toll Gate	1 00
Best collection of 4 kinds of carrots, D. Geddes, Saginaw City	3 00
2d do., E. H. Wurts, East Saginaw	2 00
Best dozen flat turnips, G. W. Prescott, Grand Rapids	2 00
2d do., E. H. Wurts, East Saginaw	1 00
Best dozen Swedes turnips, D. Geddes, Saginaw City	2 00
2d do., E. H. Wurts, East Saginaw	1 00
Best dozen any other kinds of turnips, D. Geddes, Saginaw City	2 00
2d do., G. W. Prescott, Grand Rapids	1 00
Best collection of 4 kinds of turnips, 10 of a kind, D. Geddes, Saginaw City	3 00
2d do., E. H. Wurts, East Saginaw	2 00
Best dozen of parsnips, E. H. Wurts, East Saginaw	2 00
2d do., D. Geddes, Saginaw City	1 00
Best dozen or more salsify, S. Marx, 1st Gratiot Toll Gate	2 00
2d do., H. C. Engel, Detroit	1 00
Best dozen winter radishes, E. H. Wurts, East Saginaw	2 00
2d do., D. Geddes, Saginaw City	1 00
Best dozen summer radishes, C. Van Haaften, Kalamazoo	2 00
2d do., E. H. Wurts, East Saginaw	1 00
Best collection of 3 kinds of radishes, D. Geddes, Saginaw City	3 00
2d do., C. Van Haaften, Kalamazoo	2 00
Greatest variety culinary vegetables, E. H. Wurts, East Saginaw	5 00
2d do., D. Geddes, Saginaw City	3 00
Best 4 heads drumhead cabbage, H C. Engel, Detroit	2 00
2d do , C. Van Haaften, Kalamazoo	1 00
Best four heads conehead cabbage, C. Van Haaften, Kalamazoo	2 00
2d do., A. Adell, Kalamazoo	1 00
Best 4 heads Savoy or curled cabbage, S. Marx, 1st Gratiot Toll Gate	2 00
2d do., H. C. Engel, Detroit	1 00
Best 4 heads red cabbage, C. Van Haaften, Kalamazoo	2 00
2d do., A. Adell, Kalamazoo	1 00
Best collection 5 kinds of cabbage, C. Van Haaften, Kalamazoo	3 00
2d do., A. Adell, Kalamazoo	2 00
Best 4 heads cauliflower, C. Van Haaften, Kalamazoo	2 00
2d do., S. Marx, 1st Gratiot Toll Gate	1 00
Best 4 heads broccoli, C. Van Haaften, Kalamazoo	2 00
2d do., A. Adell, Kalamazoo	1 00
Best 6 head lettuce, C. Van Haaften, Kalamazoo	2 00
2d do., S. Marx., 1st Gratiot Toll Gate	1 00
Best 6 bunches Kale, C. Van Haaften, Kalamazoo	2 00
2d do., A. Adell, Kalamazoo	1 00
Best dozen stems celery, C. Van Haaften, Kalamazoo	2 00
2d do., A. Adell, Kalamazoo	1 00
Best dozen stems rhubarb, S. Marx, 1st Gratiot Toll Gate	2 00
2d do., D. Geddes, Saginaw City	1 00
Best half dozen vegetable eggs, Wm. Evarding, Detroit	2 00
2d do., S. Marx, 1st Gratiot Toll Gate	1 00
Best dozen peppers, H. C. Enkel, Detroit	2 00
2d do., E. H. Wurts, East Saginaw	1 00
Best 3 varieties tomatoes, Peter Hughes, Greenfield	2 00
2d do., 12 each, S. Marx. 1st Gratiot Toll Gate	1 00
Best peck any varieties tomatoes, Wm. Evarding, Detroit	2 00
2d do., Wm. Evarding, Detroit	1 00
Best peck white onions, Wm. Evarding, Detroit	2 00
2d do., David Geddes, Saginaw City	1 00
Best peck red onions, C. Van Haaften, Kalamazoo	2 00
2d do. A. Adell, Kalamazoo	1 00
Best peck yellow onions, E. H. Wurtz, East Saginaw	2 00
2d do., C. Van Haaften, Kalamazoo	1 00

Best collection 5 kinds of onions, D. Geddes, Saginaw City	$3 00
2 do., A. Adell, Kalamazoo	2 00
Best 5 summer squashes, H. C. Engel, Detroit	2 00
Best 5 Marrow squashes, E. H. Wurtz, East Saginaw	2 00
2d do., H. C. Engel, Detroit	1 00
Best 5 Hubbard squashes, D. Geddes, Saginaw City	2 00
2d do., E. H. Wurtz, East Saginaw	1 00
Best single sqush, H. B. Chapman, Reading	2 00
2d do., H. C. Engel, Detroit	1 00
Best collection 4 kinds of squashes, H. C. Engel, Detroit	3 00
2d do., S. Marx, 1st Gratiot Toll Gate	2 00
Best 2 sweet pumpkins, C. Van Haaften, Kalamazoo	2 00
2d do., E. H Wurtz, East Saginaw	1 00
Best 2 field pumpkins, G. W. Prescott, Grand Rapids	2 00
2d do., C. P. Reynolds, Harrisville	1 00
Best 3 watermelons, G. W. Prescott, Grand Rapids	2 00
2d do., E. H. Wurtz, East Saginaw	1 00
Best 3 musk melons, E. H. Wurtz, East Saginaw	2 00
2d do., D. Geddes, Saginaw City	1 00
Best 3 nutmeg melons, Wm. Evarding, Detroit	2 20
2d do., D. Geddes, Saginaw City	1 00
Best 3 citrons, H. C. Engel, Detroit	2 00
2d do., E. H. Wurtz, East Saginaw	1 00
Best collection 3 kinds of melons, E. H. Wurtz, East Saginaw	3 00
2d do., G. W. Prescott, Grand Rapids	2 00
Best 5 cucumbers, W. L. Walters, Utica	2 00
2d do., Wm. Evarding, Detroit	1 00
Best half peck garden peas, W. L. Walters, Utica	2 00
2d do., E. A. Wurtz, East Saginaw	1 00
Best half peck lima beans, E. H. Wurtz, East Saginaw	2 00
2d do., C. Van Haaften, Kalamazoo	1 00
Best half peck beans, W. L. Walters, Utica	2 00
2d do., C. Van Haaften, Kalamazoo	1 00
Best half peck wax beans, D. Geddes, Saginaw City	2 00
2d do., Charles Larchen, Greenfield	1 00
Best collection 3 kinds of garden beans, E. H. Wurts, East Saginaw	3 00
2d do., G. W. Prescott, Grand Rapids	2 00
Best dozen ears early sweet corn, H. B. Chopman, Reading	2 00
2d do., E. H. Wurts, East Saginaw	2 00
Best dozen ears late sweet corn, S. Marx, 1st Gratiot Toll Gate	2 00
2d do., W. L. Walters, Utica	1 00
Best dozen ears pop corn, G. P. Lindemann, Grand Ledge	2 00
2d do., Fred T. Hall, Greenfield	1 00
Best 6 head sunflower, H. B, Chapman, Reading	2 00
2d do., David Geddes, Saginaw City	1 00
Best 6 stems Swiss chard, H. C. Engel, Detroit	2 00
2d do., E. H. Wurts, East Saginaw	1 00
Best six stems parsley, H. C. Engel, Detroit	2 00
2d do., C. Van Haaften, Kalamazoo	1 00
Best 6 stems spinach, H. C. Engle, Detroit	2 00
2d do., C. Van Haaften, Kalamazoo	1 00
Best 6 stems sweet or pot herb, H. C. Engel, Detroit	2 00
2d do., E. H. Wurts, East Saginaw	1 00
Best collection of four kinds sweet or pot herbs, E. H. Wurts, East Saginaw	3 00
2d do., C. Van Haaften, Kalamazoo	2 00
Best six stems Kohl Rabi, A. Adell, Kalamazoo	2 00
2d do., D. Geddes, Saginaw City	1 00

F. D. ADAMS,
GEO. P. BUTLER,
O. C. ABELL,
Viewing Committee.

CLASS 34—FLOUR, MEAL AND FEED.

Best barrel flour, of white wheat, C. P. Reynolds, Harrisville	$5 00
Best sample corn meal, A. Lanhoff, Detroit	2 00
Best sample buckwheat flour, R. M. Webster, Armada	2 00

Best sample rye flour, one-half bbl., A. Lanhoff, Detroit	$2 00
Best sample oat meal, Edwin Green, Detroit	2 00
2d do., Edwin Green, Detroit	1 00
Best and largest display of flour, meal and feed, W. E. Heames & Co., Detroit	5 00

H. P. MERRILL,
DAVID GEDDES,
F. D. ADAMS,
Viewing Committee.

DIVISION G—DAIRY AND OTHER PRODUCTS.

SPECIAL PREMIUMS.

The Higgins' Eureka Salt Premiums.

Best package of butter, F. C. Meade, Litchfield	Gold medal
2d do., F. S. Finley, Ypsilanti	Silver medal
3d do., W. T. Lewis, Pontiac	Bronze medal
For the best cheese, Wm. Allen, Livonia, gold medal (protested and withheld).	
2d do., A. D. Power, Farmington	Silver Medal
3d do., A. B. Smith, Farmington	Bronze Medal

The Turner Butter Premium.

Best lot or package of butter, Mrs. G. C. Gibbs, Big Beaver	$12 50
2d do., H. B. Chapman, Reading	12 50

The award of twenty-five dollars by the undersigned is divided between Mrs. G. C. Gibbs, of Big Beaver, and H. B. Chapman, of Reading, and the money has been placed in the hands of the Viewing Committee on Butter and Cheese.

HORACE TURNER.
H. J. CULVER,
DENIS WOLVERTON,
D. L. CADY,
Viewing Committee.

CLASS 35—BUTTER AND CHEESE.

Best 25 lbs. domestic butter, F. C. Meade, Litchfield	$16 00
2d do., Mrs. G. C. Gibbs, Big Beaver	12 00
3d do., Adam Bagley, Big Beaver	8 00
4th do., Mrs. P. V. Aldrich, Armada	4 00
Best 10 lbs. domestic butter, Mrs. G. C. Gibbs, Big Beaver	8 00
2d do., Vincent P. McRea, Warren	6 00
3d do., Adam Bagley, Big Beaver	4 00
4th F. S. Finley, Ypsilanti	2 00
Best display of cheese from any household or private dairy, Mrs. Wm. Lincoln, Greenville	10 00
Best display of cheese from any factory, A. D. Power, Farmington	25 00
2d do., Wm. Alden, Livonia	20 00
3d do., A. B. Smith, Farmington	15 00
4th do., Day & Lieth Ypsilanti	10 00
5th do., H. D. Platt, Ypsilanti	5 00

H. J. CULVER,
DENNIS WOLVERTON,
D. L. CADY,
Viewing Committee.

CLASS 36—SUGAR, HONEY AND BEE HIVES.

Best gallon maple syrup. I. S. Forncrook, Detroit	$3 00
2d do., M. Green, Farmington	2 00
Best 10 lbs. maple sugar, J. M. Blowers, Lawrence	5 00
2d do., I. S. Forncrook, Detroit	3 00
Best colony of bees, G. W. Long, Dearborn	6 00
2d do., A. B. Weed, Detroit	4 00

Best specimen comb honey, H. D. Cutting, Clinton	$5 00
2d do., A. D. Benham, Olivet	3 00
Best specimen extracted honey, A. B. Weed, Detroit	5 00
2d do., G. W. Long, Dearborn	3 00
Best 10 lbs. beeswax, A. D. Benham, Olivet	2 00
Best specimen artificial comb foundation, H. D. Cutting, Clinton	2 00
Best collection aparian implements, H. D. Cutting, Clinton	6 00
Best honey extractor, H. D. Cutting, Clinton	2 00
Best bee smoker, A. D. Benham, Olivet	2 00

M. McDONALD,
M. D. BROWN.
Viewing Committee.

CLASS 37—BREAD AND PICKLES.

Best 3 loaves bakers' bread, Charles Richert, Detroit	$3 00
Best 3 loaves milk or salt rising bread, Mrs P. V. Aldrich, Armada	3 00
2d do., M. H. Chase, Royal Oak	2 00
Best 3 loaves yeast bread, Mrs. P. V. Aldrich, Armada	3 00
2d do., L. A. Lilley, Allegan	1 00
Best soda rising bread, Mrs. R. Sage, Pontiac	3 00
2d do., Mrs. R. Sage, Pontiac	1 00
Best corn bread, Mrs. R. Sage, Pontiac	3 00
2d do., Mrs. R. Sage, Pontiac	2 00
Best 3 loaves brown bread, Mrs. R. Sage, Pontiac	3 00
2d do., H. B. Chapman, Reading	2 00
Best sample flour bread, L. A. Lilley, Allegan	3 00
2d do., Israel Daniels, Detroit	2 00
Best display varieties crackers, Lewis, Sykes & Co., Detroit	3 00
2d do., Vail & Crane, Detroit	2 00
Best display of specimens of pickled vegetables, G. W. Prescott, Grand Rapids	5 00
2d do., R. M. Webster, Armada	3 00

M. McDONALD,
M. D. BROWN,
Viewing Committee.

CLASS 38—SOAP, TOILET ARTICLES, ETC.

The committee find an exhibition of manufactured tubs by the Granger Tobacco Works, for which no premium is offered, and as this is a very large and important industry of Detroit, would recommend it for such recognition as the Executive Committee may see fit to give it.

W. McDONALD,
M. D. BROWN,
Viewing Committee.

DIVISION II—FARM IMPLEMENTS AND TRIALS.

CLASS 40—PLOWS.

Best plow for turning sod land, or greensward, Dodge Plow Co., Kalamazoo	$5 00
2d do., Wiard Plow Co., Batavia, N. Y	3 00
Best plow for turning under stubble, Three Rivers Plow Co., Three Rivers	5 00
2d do., Kloppel & Martin, Ida	3 00
Best plow for general use made in Michigan, Gale Mfg. Co., Albion	10 00
2d do., Lawrence & Chapin, Kalamazoo	5 00
Gest plow for general use made in any other State, Oliver Chilled Plow Co., South Bend, Ind.	10 00
Best heavy plow for new land, W. S. Penfield, Detroit	5 00
Best attachment for any plow, Gale Manufacturing Co., Albion	5 00
2d do., N. G. Pinney, New Hudson	2 00
Best subsoil plow, Wiard Plow Co., Batavia, N. Y.	5 00
Best self-cleaning plow coulter, Gale Manufacturing Co., Albion	1 00
Best gang plow, Gale Manufacturing Co., Albion	5 00

Largest and best display of plows, Gale Manfacturing Co., Albion	$50 00
2d do., E. Bement & Sons, Lansing	25 00
3d do., Lawrence & Chapin, Kalamazoo	15 00

J. J. ROBINSON,
LOREN RIGGS,
JOHN JORDAN,
Viewing Committee.

CLASS 41—TILLAGE IMPLEMENTS.

Best field roller, John Stanley, Birmingham	$5 00
2d do., W. S. Penfield, Detroit	3 00
Best harrow for general use, Polly & Wherry, Plymouth	5 00
2d do., Thos. L. Bennett, Plymouth	2 00
Best iron harrow, Polly & Wherry, Plymouth	3 00
Best wooden harrow, J. Mitchell & Bro., Oxford	3 00
Best one-horse cultivator, E. Bement & Sons, Lansing	3 00
Best machine for hoeing and weeding drills in garden, W. S. Penfield, Detroit	2 00
Best display of cultivators, Robbins Cultivator Co., Jackson	50 00
2d do., P. P. Mast & Co., Springfield, Ohio	25 00
3d do., Luther & Sumner, Grand Rapids	10 00

O. R. PATTENGILL,
ISRAEL N. SMITH,
THOMAS McCLUMPHA,
Viewing Committee.

CLASS 42—SEED DRILLS, SOWERS AND PLANTERS

Best two-horse seed drill, Thomas Ludlow & Rogers, Springfield, Ohio	$25 00
2d do., P. P. Mast & Co., Springfield, Ohio	15 00
Best two-horse broadcast seeder for grain, D. W. McSherry & Co., Dayton, O.	20 00
2d do., Robbins Cultivator Co., Jackson	10 00
Best grass and clover seed sower for horse power, Thomas Ludlow & Rogers, Springfield, Ohio	3 00
Best grass seed sower for hand work, W. S. Penfield, Detroit	2 00
Best corn and bean planter to work by horse power, Emerson, Falcott & Co., Rockford, Ill.	5 00
Best drill for sowing seeds or roots, W. S. Penfield, Detroit	1 00
Best hand corn planter, W. S. Penfield, Detroit	1 00

DEXTER WHITE,
C. J. SPRAGUE,
S. TINGLEY,
Viewing Committee.

CLASS 43—HAYING AND HARVESTING IMPLEMENTS.

Best horse rake, A. F. Chandler, Coldwater	$15 00
2d do., Van Brunt & Barber, Horicon, Wis.	10 00
3d do., W. S. Penfield, Detroit	5 00
Best machines for mowing lawns by hand, W. S. Penfield, Detroit	1 00
Best hay rigging for double wagon, George Nollor, Salem Station	2 00

HARVEY HAYNES,
NELSON BAKER,
ROYAL C. SAYLES,
Viewing Committee.

CLASS 44—APPARATUS AND MACHINES.

Best horse power for farm use, Battle Creek Machinery Co., Battle Creek	$20 00
2d do., Battle Creek Machinery Co., Battle Creek	15 00
Best display of feed cutters, W. S. Penfield, Detroit	15 00
2d do., Luther & Sumner, Grand Rapids	10 00
Best display of corn shellers, Woodford & Niles, Detroit	15 00
2d do., W. S. Penfield, Detroit	10 00
Best corn sheller, W. S. Penfield, Detroit	3 00
Best fanning mill, Martin & Simmons, Racine, Wis.	5 00
Best straw and stalk cutter for hand power, John Wells, Flat Rock	3 00
Best machine for pulping roots, W. S. Penfield, Detroit	5 00

Best contrivance for steaming food for cattle and hogs, not less than 20 head, A. Newkirk, Cleveland, Ohio	$5 00
Best portable cider mill, P. P. Mast & Co., Springfield, Ohio	2 00
Best portable steam engine, Nichols, Shepard & Co., Battle Creek, Diploma and	10 00
Best portable grist mill, Woodford & Niles, Detroit	10 00
2d do., W. S. Penfield, Detroit	5 00
Best hay or cattle scales, Buhl, Ducharme & Co., agents for Buffalo Scale Co., Buffalo, N. Y. Medal and	20 00

A. J. B. GULLY,
ALBERT G. GATES,
A. J. VAN WICK,
Viewing Committee.

CLASS 45—MISCELLANEOUS FARM ARTICLES.

Best drag sawing machine, Battle Creek Machinery Co., Battle Creek	$20 00
Best circle sawing machine, Battle Creek Machinery Co., Battle Creek	15 00
Best stump puller, Linden & Dunneback, Lansing	10 00
Best display of hand tools, W. S. Penfield, Detroit	20 00
Best road scraper, Woodford & Niles, Detroit	2 00
Best wheelbarrow, Jno. Bean & Son, Springfield, Ohio	2 00
Best 6 hand corn cutters, W. S. Penfield, Detroit	1 00
Best 6 grub hoes, W. S. Penfield, Detroit	2 00
Best grain cradle, W. S. Penfield, Detroit	1 00
Best display of shovels, spades, and axes, W. S. Penfield, Detroit	5 00
Best set of grain measures, W. S. Penfield	1 00
Best hand pump for wells, D. J. Nysewander, Springfield, Ohio	2 00
Best cistern pump, A. F. Chandler, Coldwater	1 00
Best tubular pump, Kalamazoo Tubular Well Co., Kalamazoo	1 00
Best farm gate, Ferm & Allen, Oxford	1 00
Best farm fence, A. H. Smith, Detroit	1 00

F. S. FINLEY,
ALONZO EATON,
MARVIN R. STRONG,
Viewing Committee.

CLASS 46—DAIRY AND HOUSEHOLD ARTICLES.

Best churn for making butter, J. L. Sprague, Minneapolis, Minn.	$1 00
Best milk strainer, F. S. Finley, Ypsilanti	1 00
Best milk safe, J. H. Richardson, South Toledo, Ohio	1 00
Best 6 mops and handles, Wm. A. Cook, Grand Rapids	1 00
Best weights and scales for dairy use, Buhl, Ducharme & Co., Detroit	1 00
Best washing machine, A. A. Randall, Leamington, Ont.	2 00
Best clothes wringing machine, A. R Masier, Detroit	1 00
Best clothes horse, A. R. Masier, Detroit	1 00
Best assortment tin or metal ware for dairy or kitchen use, C. Puddefoot, Detroit	3 00
Best fruit dryer, A. McPherson, Detroit	5 00
Best cheese safe, I. S. Forncrook, Detroit	1 00
Best clothes dryer, A. L. Denel, Detroit	1 00

S. O. CADY,
NELSON POOLER,
B. B. MOSHER,
Viewing Committee.

DIVISION I—VEHICLES.

CLASS 47—WAGONS AND CARRIAGES.

Best two-horse family carriage, Slevers & Erdman, Detroit	$10 00
2d do., W. E. Biddle & Co., Detroit	5 00
Best one-horse carriage, Reichlie Bros., Detroit	6 00
2d do., M. Cooney & Co., Toledo, Ohio	3 00
Best two-spring phaeton, H. C. Gray & Co., Romeo	6 00
2d do., Reichlie Bros., Detroit	3 00
Best three-spring phaeton, H. C. Gray & Co., Romeo	6 00

Best top buggy, Sievers & Erdman, Detroit	$6 00
2d do., M. Cooney & Co., Toledo, Ohio	3 00
Best buggy without top, Peter Black, Cleveland, Ohio	6 00
2d do., J. W. Hewitt & Son, Jackson	3 00
Best trotting wagon, Milburn Wagon Co., Toledo, Ohio	6 00
Best trotting sulky, A. Bedford, Coldwater	6 00
2d do., J. W. Hewitt & Son, Jackson	3 00
Best farm wagon for all purposes, Austin, Tomlinson & Webster, Jackson	10 00
2d do., Milburn Wagon Co., Toledo, Ohio	5 00
Best spring wagon for market purposes, Cortland Wagon Co., Cortland, N. Y., second premium	5 00
Best single sleigh or cutter, Geo. Finister, Detroit	5 00
2d do., I. A. Ketchum, Detroit	3 00
Best carriage jack, W. S. Penfield, Detroit	1 00
Best display of above articles, Milburn Wagon Co., Toledo, Ohio	20 00
2d do., Wilson Bros., Detroit	10 00

N. ARKSEY,
J. HANNAN,
I. S. FORNCROOK,
Viewing Committee.

DIVISION J—MACHINERY.

CLASS 48—MACHINERY FOR WORKING UPON IRON.

Best stationary steam engine, Kennedy & Greig, Detroit	Medal
Best portable forge, G. S. Wormer & Sons, Detroit	Diploma
Best self-oiler for machines, Henry McGraw, Detroit	Diploma
Best governor for engine, G. S. Wormer & Sons, Detroit	Medal
Best coupling for shafting, G. S. Wormer & Sons, Detroit	Medal
Best steam valve, Jas. Flower & Bro., Detroit	Medal

MACHINERY FOR WORKING UPON WOOD.

Best scroll saw, T. B. Rayl, Detroit	Diploma
Best planer and matcher, G. S Wormer & Sons, Detroit	Medal
Best tenoning machine, G. S. Wormer & Sons, Detroit	Diploma
Best mortising machine, G. S. Wormer & Sons, Detroit	Diploma
Best heading machine, G. S. Wormer & Sons, Detroit	Diploma
Best stave-cutting machine, G. S. Wormer & Sons	Medal
Best moulding machine, G. S. Wormer & Sons, Detroit	Diploma
Best stave jointer, G. S. Wormer & Sons, Detroit	Medal
Best blind wireing machine, G. S. Wormer & Sons, Detroit	Medal
Best automatic lathe, Battle Creek Machinery Co., Battle Creek	Diploma
Best foot-power lathe, F. Zabriskie, Detroit	Diploma
Best hoop machine, J. Dobbin & Co., Marine City	Medal

MISCELLANEOUS MACHINERY.

Best machine for making brick, H. Brewer & Co., Tecumseh, Mich	Diploma
Best steam printing press, Detroit Free Press Co., Detroit	Medal
Best card printing press, Cornwells, Price & Co., Detroit	Medal
Best machine for making tile, Adrian Brick and Tile Machine Co., Adrian	Diploma
Best hand fire engine, H. A. Howe, Detroit	Medal
Best display of tools for iron work, G. S. Wormer & Sons, Detroit	$20 00
2d do., F. Zabriskie, Detroit	10 00
Best display of tools for wood work, G. S. Wormer & Sons, Detroit	20 00
2d do., G. S. Wormer & Sons, Detroit	10 00
Best display of emery grinding machines, Detroit Emery Wheel Co., Detroit	5 00
Best display of stave and heading machines, G. S. Wormer & Sons, Detroit	10 00
Best display of steam pumps, G. S. Wormer & Sons, Detroit	15 00
2d do., G. S. Wormer & Sons	10 00
Best lath packing machine, G. S. Wormer & Sons, Detroit	5 00
Largest and best display of machinery, G. S. Wormer & Sons, Detroit	75 00
Best rachet drill, G. S. Wormer & Sons	2 00
Best locomotive jack screw, G. S. Wormer Sons, Detroit	2 00

Best new article for working upon wood, J. H. Lewis, Detroit	$5 00
Best new article relating to agriculture, J. H. Lewis, Detroit	5 00

The viewing committee for the department of machinery have made an impartial examination of the exhibits in that department, and have awarded the various premiums, of which the above and foregoing is a correct statement, to the best of their judgment. The committee take this occasion to call special attention to the very full and meritorious exhibition of machinery, etc., made by Messrs. G. S. Wormer & Sons, which firm is one of the oldest exhibitors, and have repeatedly gone to a large expense in fitting up machinery hall, making their exhibit, etc., and in view of those facts they would recommend that the firm of G. S. Wormer & Sons be awarded a special cash premium of $50.00.

The committee would also call attention to the exhibit of Messrs. Pingree & Smith, of machinery for the the manufacture of boots and shoes, for which there was no premium offered. Messrs. Pingree & Smith went to considerable expense, having put up the building which they occupied, and where they had thirty-five persons constantly employed, constituting a very interesting feature of the fair, as attested by the constant throng of visitors. As a reward to Messrs. Pingree & Smith, and to encourage future exhibitions of the same class, the committee would recommend the award of a special cash premium of $75.00.

J. A. GROSVENOR,
JAS. H. MASON,
D. C. SMALLEY,
Viewing Committee.

DIVISION K—MANUFACTURED GOODS.

CLASS 50—HOME MADE.

Best pair waolen blankets, R. Stage, Pontiac	$5 00
2d do., W. T. Lewis, Pontiac	3 00
3d do., W. T. Lewis, Pontiac	2 00
Best 10 yards woolen flannel, Mrs. W. T. Lewis, Pontiac	3 00
2d do., Mrs. R. Stage, Pontiac	2 00
Best hearth rug, Mrs. J. Smith, Lawton	2 00
Best 10 yards rag carpet, Mrs. R. Stage, Pontiac	3 00
2d do., Joseph Ellis, Detroit	2 00
Best woolen coverlet, Mrs. R. Stage, Pontiac	2 00
2d do., Mrs. R. Stage, Pontiac	1 00
Best pair woolen stockings, Mrs. E. W. Anthony, Detroit	1 00
2d do., Mrs. M. Leslie, Dearborn	50
Best pair woolen socks, Mrs. A. McClary, Galesburg	1 00
2d do., Mrs. R. Stage, Pontiac	50
Best pair woolen mittens, Mrs. R. M. Webster, Armada	1 00
2d do., Mrs. W. T. Lewis, Pontiac	50
Best 2 pounds stocking yarn, Harvey Perkins, Birmingham	2 00
2d do., Mrs. W. T. Lewis, Pontiac	1 00
Best pair cotton socks, Mrs. M. Leslie, Dearborn	1 00
2d do., Miss Clara A. Peacock, Pontiac	50
Best pair cotton stockings, Mrs. M. W. Clark, Parma	1 00
2d do., Mrs. R. Stage, Pontiac	50
Best and greatest variety of articles, not less than ten in number, made by any one family, but not containing any article entered separately for single premiums, or that has been exhibited at any previous State Fair, Wm. F. Kelly, Pontiac	10 00
2d do., Mrs. R. Stage, Pontiac	5 00

CLASS 51—MATERIALS.

Best display of fine wools, J. S. Bamber, Highland	$7 00
2d do., VanGieson Bros., Clinton	5 00
Best display of long wools, Amos F. Wood, Mason	7 00
Best display of middle wools, Thos. A. Moore, Ypsilanti	7 00
Best display of prepared flax, Mrs. A. McClary, Galesburg	5 00

D. P. DEWEY,
E. W. HARDY,
J. D. ALCOTT,
Viewing Committee.

CLASS 52—FACTORY MADE.

Best display of carpets, Barclay & Black, Detroit	$5 00
2d do., Abbot & Ketchum, Detroit	3 00
Best 5 hearth rugs, Abbot & Ketchum, Detroit	2 00
Best 5 fancy door mats, Abbot & Ketchum, Detroit	2 00
Best display of window curtains, Abbot & Ketchum, Detroit	2 00
Best display of window shades, Wm. Lynch, Detroit	2 00
Best display of oil cloths, Barclay & Black, Detroit	5 00
2d do., Abbot & Ketchum, Detroit	3 00
Best 2 Marseilles quilts, James Nall & Co., Detroit	1 00
Best display of paper hangings, Bamford & Humphrey, Detroit	5 00

Best stair rods, thordies, Barclay & Black, Detroit, complimented.
Best Persian rug, Barclay & Black, Detroit, complimented.
Best Kherassan rug, Barclay & Black, Detroit, complimented.

A. F. CHANDLER,
W. HAWORTH,
E. R. BISHOP,
Viewing Committee.

CLASS 53—ARTICLES OF DRESS.

Best suit of Men's clothes, C. R. Mabley, Detroit	$5 00
2d do., Albert A. Tripp, Detroit	3 00
Best made overcoat, Albert A. Tripp, Detroit	3 00
Best made dress coat, C. R. Mabley, Detroit	3 00
Best made frock coat, C. R. Mabley, Detroit	3 00
Three best made shirts, C. R. Mabley, Detroit	2 00
Best display of silk hats, C. H. Dickerson, Detroit	5 00
2d do., Walter Buhl & Co., Detroit	2 00
Best display of fur hats, Walter Buhl & Co., Detroit	5 00
2d do., C. H. Dickerson, Detroit	2 00
Best display of soft hats, Walter Buhl & Co., Detroit	2 00
Best display of boys' caps, C. H. Dickerson, Detroit	1 00
Best display of gents' furs, Walter Buhl & Co., Detroit	3 00
2d do., C. H. Dickerson, Detroit	2 00

We, the undersigned, would most respectfully recommend that a special prize be given to Mr. C. R. Mabley, for his splendid display of boys' and children's clothing.

SAM'L HEAVENRICH,
SELIGMAN SCHLOSS,
Viewing Committee.

CLASS 54—ARTICLES OF LEATHER AND INDIA RUBBER.

Best pair of gents' summer boots, R. H. Fyfe & Co., Detroit	$1 00
Best pair gents' winter boots, R. H. Fyfe & Co., Detroit	1 00
Best pair kip boots, Pingree & Smith, Detroit	1 00
Best pair lady's summer walking boots, R. H. Fyfe & Co., Detroit	1 00
Best pair lady's winter walking boots, R. F. Fyfe & Co., Detroit	1 00
Best pair of lady's winter shoes, J. B. Stevens & Co., Detroit	1 00
Best pair misses' shoes, Pingree & Smith, Detroit	1 00
Best pair children's shoes, Pingree & Smith, Detroit	1 00
Best pair gents' slippers, R. H. Fyfe & Co., Detroit	1 00
Best pair lady's slippers, R. H. Fyfe & Co., Detroit	1 00
Best horse collar, Valentine Hetts, Lapeer	2 00
2d do., Wm. Voley, Forest, Ontario	1 00
Best display of boots and shoes of all kinds, R. H. Fyfe & Co., Detroit	10 00
2d do., A. R. Morgan, Detroit	5 00
Best display buffalo robes, C. H. Dickerson, Detroit	5 00
Best display fancy robes, Walter Buhl & Co., Detroit	3 00

For best pair gents' winter boots committee award first premium (which is $1) to R. H. Fyfe & Co., which is the only premium offered, but they recommend that J. B. Stevens & Co. have premium of $1, and that Johnson & Thomas have a second premium; also recommend that J. B. Stevens & Co. have a second premium for pair lady's summer walking boots, being only one premium offered.

S. P. WILCOX,
I. M. COLVIN,
Viewing Committee.

CLASS 55—ARTICLES OF FURNITURE.

Best set of parlor furniture, Kirchberg, Winterhalter & Keenan, Detroit	$20 00
2d do., C. Webber, Detroit	10 00
3d do., Horace Turner, Detroit	5 00
Best lounge or couch, Horace Turner, Detroit	3 00
2d do., A. Dondero, Detroit	2 00
Best easy chair, Horace Turner, Detroit	3 00
2d do., L. E. Cross, Detroit	2 00
Best smoking or lounging chair, L. E. Cross, Detroit	3 00
Best upholstered reception chair, Horace Turner, Detroit	3 00
2d do., Kirchberg, Winterhalter & Keenan, Detroit	2 00
Best center table, C. Weber, Detroit	3 00
2d do., Kirchberg, Winterhalter & Keenan, Detroit	2 00
Best library table, Marcus Stevens, Detroit	3 00
Best pier, mirrors and base, Kirchberg, Winterhalter & Keenan, Detroit	5 00
Best mantel mirror, C. Weber, Detroit	5 00
2d do., Kirchberg, Winterhalter & Keenan, Detroit	3 00
Best window cornice, Kirchberg, Winterhalter & Keenan, Detroit	2 00
Best lambrequin, Abbot & Ketchum, Detroit	2 00
2d do., Kirchberg, Winterhalter & Keenan, Detroit	1 00
Best set chamber furniture, C. Weber, Detroit	10 00
2d do., Marcus Stevens, Detroit	7 00
Best spring mattress, C. Weber, Detroit	2 00
2d do., Kirchberg, Winterhalter & Keenan, Detroit	1 00
Best mattress for bed, Kirchberg, Winterhalter & Keenan, Detroit	2 00
2d do., Dudley & Fowle, Detroit	1 00
Best sideboard, C. Weber, Detroit	3 00
2d do., Dudley & Fowle, Detroit	2 00
Best book case, Dudley & Fowle, Detroit	3 00
Best secretary, Geo. S. Tompkins, Detroit	3 00
Best parlor writing desk, C. Weber, Detroit	3 00
2d do., Geo. S. Tompkins, Detroit	2 00
Best office desk, Geo. S. Tompkins, Detroit	3 00
2d do., Dudley & Fowle, Detroit	2 00
Best desk of any kind, Geo. S. Tompkins, Detroit	3 00
2d do., C. Weber, Detroit	2 00
Best hall tree or hat rack, C. Weber, Detroit	2 00
Best display of furniture of all kinds, C. Weber, Detroit	15 00
2d do., Kirchberg, Winterhalter & Keenan, Detroit	10 00
Best child's crib, A. Dondero, Detroit	2 00
2d do., A. Dondero, Detroit	1 00
Best child's carriage, F. A. Decker, Detroit	2 00
2d do., A. Dondero, Detroit	1 00
Best display of willow or rattan chairs, A. Dondero, Detroit	2 00
Best display of rustic woodwork, A. Dondero, Detroit	1 00
Best assortment of school furniture, Buffalo Hardware Co., Buffalo, N. Y.	Diploma
2d do., Michigan School Furniture Co., Northville	Medal
Best church and pulpit seats, Michigan School Furniture Co., Northville	Diploma

Committee desire to call attention to one library suite of 6 pieces exhibited by Marcus Stevens (Nos. 457, 458, and 459), on account of its excellent style and workmanship, and recommend a special premium for same.

Under class of sofas (No. 25) C. Weber enters one bed sofa. Committee do not consider that article to come under the head of sofas, but recommend that a diploma be given for same.

Committee desire to call especial attention to a bed lounge entered by Horace Turner, entry No. 35 is 15 lounges, and recommend the highest award be given for the same; remarkable for its simplicity, comfort, and general common sense.

One mantel mirror, entered by Marcus Stevens (No. 119), Committee say: This glass is worthy of special mention on account of the satin puffing in the frame, and would recommend a discretionary premium for same.

Best display of furniture of all kinds. After awarding first and second premiums to other parties, Committee say: H. Turner and Dudley & Fowle are considered as making a display about equal, although entirely different in class of goods, and are both deserving a diploma for same.

Display of willow chairs by Christian Stuebben, Greenfield (entry No. 345), committee recommend a special premium for fine workmanship.

Entry No. 377, assortment of school furniture, Kappee F. F. & S. D. Co., after awarding to competitors the premiums offered (medal and diploma), recommend a discretionary premium.

Committe recommend that premiums be offered for fancy baskets, market baskets, clothes and hamper baskets.

ALFRED A. GRAY,
M. W. SWAIN,
AUGUST SCHULTE,
Viewing Committee.

CLASS 56—STOVES, IRON WORK, AND ORNAMENTAL CONCRETE WORK.

Best display of ornamental bracket work, E. T. Barnum, Detroit	$3 00
Best ornamental cast iron vase or pedestal, E. T. Barnum, Detroit	3 00
Best cast iron gate, E. T. Barnum, Detroit	3 00
Best display of iron work, E. T. Barnum, Detroit	3 00
Best cast iron fence, E. T. Barnum, Detroit	3 00
Best ornamental fountain, E. T. Barnum, Detroit	2 00
Best parlor grate, Probasco & Rumney, Detroit	2 00
Best casting for fire front, Probasco & Rumney, Detroit	2 00
Best ornamental iron statuary, E. T. Barnum, Detroit	2 00
Best iron chair, E. T. Barnum, Detroit	1 00
Best fruit and flower stand, E. T. Barnum, Detroit	1 00
Best display of rustic work, E. T. Barnum, Detroit	2 00

ALBERT CHANDLER,
L. F. MARGACH,
GEO. S. TOMPKINS,
Viewing Committee.

DIVISION L—MUSICAL INSTRUMENTS.

CLASS 57—PHILOSOPHICAL, SURGICAL AND OTHER INSTRUMENTS.

Best artificial leg or arm, Jas. A. Foster, Detroit	Diploma
Best display of spectacles, L. Black & Co., Detroit	Diploma
Best display of fine perfumery, John Davis, Detroit	Diploma

A. C. WORTLEY,
F. A. APEL,
F. C. PINGREE,
Viewing Committee.

CLASS 58—CLOCKS, JEWELRY, PLATED WARE, ETC.

Best exhibition of clocks for household use or parlor ornament, Eugene Deimel, Detroit	$3 00
Best exhibition of silver or plated ware, M. S. Smith & Co., Detroit	5 00
R. Rubenstein, Detroit, diploma on process of plating.	
Best exhibition of table cutlery, M. S. Smith & Co., Detroit	2 00
Best display of American watches, M. S. Smith & Co	3 00
Best case of jewelery, M. S. Smith & Co., Detroit	Diploma
Best case of diamonds, M. S. Smith & Co., Detroit	Diploma

A. C. WORTLEY,
FRANK A. APEL,
F. C. PINGREE,
Viewing Committee.

DIVISION M—PAINTING, NEEDLEWORK, ETC.

CLASS 59—PAINTING AND SCULPTURE.

Best display of marble statuary, William Schulties, Detroit	$5 00
Best display bronze statuary, M. S. Smith & Co., Detroit	3 00
Best specimen marble statuary, William Schulties, Detroit	5 00
Best specimen bronze statuary, M. S. Smith & Co., Detroit	3 00
Best landscape painting in oil of scenery in Michigan, Robert Hopkin, Detroit	5 00
2d do., Philip G. Kramer, Jr., Detroit	3 00

Best historical painting in oil done by exhibitor, W. T. Trego, Detroit	$5 00
Best composition landscape in oil, Robert Hopkin, Detroit	5 00
2d do., Charles H. Eaton, Holly	3 00
Best landscape from nature, in oil, Charles H. Eaton, Holly	3 00
2d do., Mortimer L. Smith, Detroit	2 00
Marine scene, in oil, Robert Hopkin, Detroit	3 00
2d do., Robert Hopkin, Detroit	2 00
Best animal piece from life, in oil, Robert Fawcett, Livonia	3 00
Best bird piece, in oil, Robert Hopkin, Detroit	3 00
2d do., Miss Lillie Gear, Greenville	2 00
Best fruit piece, in oil, Mrs. Wm. W. Antisdell, Detroit	2 00
Best flower piece, in oil, Mrs. Wm. W. Antisdell, Detroit	3 00
Best portrait from life, large size, in oil, done by exhibitor, L. T. Ives, Detroit	5 00
Best portrait from life, cabinet size, in oil, done by exhibitor, J. K. Trego, Detroit	3 00
2d do., W. Thurston Black, Detroit	2 00
Best fancy painting in oil, done by exhibitor, L. T. Ives, Detroit	3 00
2d do., L. T. Ives, Detroit	2 00
Best head, cabinet size, in oil, done by exhibitor, J. K. Trego, Detroit	2 00
Best oil painting by any person under 16, done by exhibitor, Miss Ida Hill, Detroit	2 00
Best landscape painting in water colors of scenery in Michigan, Robert Hopkin, Detroit	3 00
Best landscape painting in water colors, done by exhibitor, Miss Laurette Elbert, Detroit	3 00
Best animal painting in water colors, done by exhibitor, Sylvester Larned, Detroit	3 00
2d do., Miss Laurette Elbert	2 00
Best fancy painting in water colors, done by exhibitor, Robert Hopkin, Detroit	3 00
2d do., Mrs. R. Wagner, Detroit	2 00
Best historical painting shown by any person, A. J. Brow, Detroit	2 00
Best landscape painting shown by any person, A. J. Brow, Detroit	2 00
Best portrait in oil shown by any person, Mrs. M. A. Chappel, Detroit	2 00
Best other painting in oil shown by any person, Miss Marie Louise Phelps, Detroit	2 00
2d do., Miss Marie Louise Phelps, Detroit	1 00
Best water color paintings shown by any person, A. J. Brow, Detroit	2 00
2d do., A. J. Brow, Detroit	1 00
Best collection of oil paintings, not less than 5 in number, by a person not a dealer, L. T. Ives, Detroit	5 00
2d do., J. K. Trego, Detroit	3 00
Best collection of water color paintings, not less than 5 in number, by a person not a dealer, A. J. Brow, Detroit	3 00
2d do., Sylvester Larned, Detroit	2 00
Best collection of oil paintings by any dealer or association, 25 or more, owned in Michigan, A. J. Brow, Detroit	10 00
Best pastel painting of face, W. Thurston Black, Detroit	2 00
Best pastel painting of landscape, Mrs. R. Wagner, Detroit	2 00
Best crayon drawing of face, Miss Annie E. Pitkin, Detroit	2 00
2d do., S. Grant Haywood, Ypsilanti	1 00
Best crayon drawing of landscape, A. Kuhlman, Detroit	2 00
2d do., Mrs. F. Bethel, Detroit	1 00
Best collection of photographs by any person, Bigelow & Taylor, Detroit	3 00
2d do., J. E. Watson, Detroit	2 00
Best portrait photograph, life size, Bigelow & Taylor, Detroit	2 00
2d do., Bigelow & Taylor, Detroit	1 00
Best landscape photograph, A. W. Abraham, Detroit	2 00
Best animal photograph, Miss Lillie Gear, Greenville	2 00
Best portrait photograph, colored, Bigelow & Taylor, Detroit	2 00
Best 3 cabinet photographs, Bigelow & Taylor, Detroit	2 00
Best half dozen miniature photographs, Bigelow & Taylor, Detroit	2 00
Best half dozen miniature porcelain photographs, Bigelow & Taylor, Detroit	2 00
Best engraving, steel plate, A. J. Brow, Detroit	3 00
2d do., A. J. Brow, Detroit	2 00

Best engraving, wood cut, H. C. Markham, Detroit	$2 00
Best pencil drawing, landscape, Miss A. F. O'Reilly, Detroit	2 00
2d do., J. C. Cornwell, Ann Arbor	1 00
Best drawing of any animal upon the grounds, W. Trego, Detroit	3 00
Best drawing of any building on the grounds, A. W. Abraham, Detroit	3 00
Best India ink drawing, J. D. McLaulin, Detroit	3 00
2d do., Chas. E. Sutherland, Detroit	2 00
Best specimen of architectural drawing, Mason & Rice, Detroit	3 00
2d do., A. C. Varney & Co., Detroit	2 00
Best sign painting, J. L. Herig, Detroit	3 00
2d do., Bamford & Humphrey, Detroit	2 00
Best collections of imitations of wood and marble, Bamford & Humphrey, Detroit	2 00
Best display of gilt frames, A. J. Brow, Detroit	2 00
Best display of picture frames, A. J. Brow, Detroit	2 00
Best collection of chromos, not less than 10 in number, A. J. Brow, Detroit	3 00
Best chromo landscape, A. J. Brow, Detroit	2 00
Best chromo portrait, A. J. Brow, Detroit	2 00
Best chromo of animal or birds, A. J. Brow, Detroit	2 00
2d do., A. J. Brow, Detroit	1 00
Best chromo of fruit, A. J. Brow, Detroit	2 00
Best set stereoscopic views, A. W. Abraham, Detroit	2 00
Best decorated pottery, Sylvester Larned, Detroit	2 00
Best painting on porcelain, Mrs. C. Wagner, Detroit	2 00
2d do., Miss S. Kelly, Detroit	1 00
Best painting on slate, Miss S. Kelly, Detroit	2 00
2d do., Mrs. R. Wagner, Detroit	1 00

HENRY B. BROWN,
HENRY W. ROGERS,
JOSEPH SILL,
WM. JENNISON.

CLASS 60—ARTICLES OF LADIES' DRESS.

Best ladies' walking dress, Mrs. L. Story, Detroit	$3 00
Best silk skirt, C. H. Curtis, Detroit	2 00
2d do., C. H. Curtis, Detroit	1 00
Best suit of under garments, Mrs. M. A. Chappel, Detroit	3 00
Best corset, C. H. Curtis, Detroit	2 00
2d do., Miss C. Kohler, Detroit	1 00
Best and largest display of fur goods, Walter Buhl & Co., Detroit, Diploma and	5 00

MRS. EMORY WENDELL,
Viewing Committee.

CLASS 61—PLAIN NEEDLE AND MACHINE WORK.

Best fine shirt, all by hand, Mrs. C. G. Hampton, Detroit	$2 00
2d do., Mrs. M. A. Chappel, Detroit	1 00
Best silk patchwork quilt, by hand, Louise S. Tillman, Detroit	3 00
2d do., Mrs. J. E. Swales, Detroit	2 00
Best calico patchwork quit, by hand, Mrs. A. Lawrence, Detroit	2 00
Best worsted patchwork quilt, by hand, L. E. Cunningham, Detroit	2 00
2d do., Mrs. W. E. Wyckoff, Detroit	1 00
Best plain white muslin quilt, by hand, Mrs. A. McClary, Galesburg	2 00
Best gent's dressing gown, Mrs J. McLeod, Detroit	2 00
Best pair plain sheets, by hand, Mrs. C. G. Hampton, Detroit	2 00
2d do., Mrs. W. T. Lewis, Pontiac	1 00
Best pair plain pillow cases or covers, Mrs. P. V. Aldrich, Armada	2 00
Best set of pillow shams, Mrs. Ina Stubenskie, Detroit	2 00
2d do., Mrs. E. L. Slaght, Royal Oak	1 00
Sample of braiding by hand, Mrs. M. W. Clark, Parma, 2d premium	1 00
Best sample of patched garment, Jas. Smith, Greenfield	2 00
Best plain sewing by machine, Mrs. G. L. Sampson, Detroit	2 00
Best fine skirt by Machine, Mrs. M. W. Clark, Parma	2 00
Best infant's dress and skirt by machine, Madame Hude, Detroit	2 00
Best suit made and quilted by machine, Mrs. G. Callon, Detroit	2 00

MRS. EMORY WENDELL,
MRS. L. E. CLARK,
MRS. E. S. HEINEMAN,
Viewing Committee.

CLASS 62—EMBROIDERY AND ORNAMENTAL NEEDLE WORK.

Best and largest collection of ornamental needle work or embroidery done by one person, Mrs. Ira Mayhew, Detroit	$8 00
Specimens of embroidered infant's dress or skirt in cotton or linen, Madame Hude	2 00
Specimens of embroidered handkerchief, in cotton or linen, Mrs. Ira Mayhew, Detroit	2 00
2d do., Mrs. Ira Mayhew, Detroit	1 00
Set of table mats in cotton or linen, Mrs. M. W. Clark, Parma	2 00
Best specimen of embroidered infant's dress or skirt in silk, Mrs G. L. Sampson, Detroit	2 00
Best specimen of embroidered ottoman, or chair cover in silk, Mrs Geo. Doty, Detroit	2 00
2d do., Miss Augusta Armstrong, Detroit	1 00
Best specimen of embroidered piano or table cover in silk, Mrs. W. A. Gavett, Detroit	2 00
2d do. Madame Hude, Detroit	1 00
Best specimen of embroidered slippers in silk, Madame Hude, Detroit	2 00
Best specimen of embroidered lady's dress or mantle in silk, Miss Lillie Gear, Greenville	2 00
Best samples of pictures worked in worsted, Mrs. Dr. Cleveland, Detroit, 76 Sproat st.	3 00
2d do., P. Faltis, Detroit, 15 Pine st.	2 00
Best sample of cut or raised work in worsted, H. Walton, Pontiac	2 00
2d do., Miss C. Robinson, Detroit	1 00
Best pair toilet mats in worsted, Miss Pilkin, Detroit, 124 High st.	1 00
2d do., Mrs. M. W. Clark, Parma	50
Best pair lamp mats in worsted, Mrs. M. W. Clark, Parma	1 00
Best combined fire screen in worsted, Mrs. A. J. Brow, Detroit	2 00
2d do., Mrs. R. Wagner, Detroit	1 00
Best toilet cushion in worsted, Miss Maggie Sheehy, Detroit	2 00
2d do., Clara B. Doty, Detroit	1 00
Best chair or ottoman cover in worsted, Mrs. P. R. Husted	2 00
Best samples of embroidered sofa or applique pillow in worsted and silk, Sylvester Larned, Detroit	2 00
2d do., Madame Hude, Detroit	1 00
Best specimen honiton lace work, Miss Anna Williams, Detroit	2 00
Best applique embroidery, Miss C. Robinson, Detroit	2 00
Best cretonne embroidery, Sylvester Larned, Detroit	2 00
2d do., Mrs. J. Eatdrop, Detroit	1 00

CLASS 63—CROTCHET, KNIT AND FANCY WORK.

Best gent's scarf, Thos. Langley, Greenfield	$2 00
2d do., W. W. Riggs, Sylvan Centre	1 00
Best Afghan robe, Mrs. E. R. Olds, Hartford	3 00
2d do., Mrs. W. A. Acker, Richmond	2 00
Best child's Afghan robe, Madame Hude, Detroit	2 00
2d do., Miss Emily Owen, Detroit	1 00
Best cotton tidy, Mrs. Geo. Finister, Detroit	2 00
2d do., Mrs. Finister, Detroit	1 00
Best worsted tidy, Mrs. A. J. Brow, Detroit	2 00
2d do., Mrs. J. R. Haliburton, Detroit	1 00
Best pair crochet lamp maps, Mrs. A. J. Brow	2 00
Best crochet or knit hood, Miss Emily Owen, Detroit	2 00
2d do., Madame Hude, Detroit	1 00
Best crochet or knit bedspread, Mrs. Geo. Doty, Detroit	2 00
2d do., Mrs. Bridget Dailey, Detroit	1 00
Best crochet or knit shawl, Mrs. A. J. Brow	2 00
2d do., Mrs. A. J. Brow, Detroit	1 00
Best crochet or knit cloak, Madame Hude, Detroit	2 00
2d do., Miss Clara A. Peacock Pontiac	1 00
Best fancy pin cushion, Madame Hude, Detroit	1 00
2d do., Miss C. A. Peacock, Pontiac	50
Best fancy purse, Mrs. Dr. Ferguson, Detroit	1 00
2d do., Mrs. R. A. Haliburton, Detroit	50

MRS. ELISHA TAYLOR,
MRS. J. S. FARRAND,
MRS. A. J. BROW,
Viewing Committee.

CLASS 64—HAIR, SHELL AND WAX WORK.

Best and largest display of hair work, Mrs. R. W. Allen, Detroit	$3 00
2d do., Wm. F. Kelly, Pontiac	2 00
Best display of wax work, Mrs. E. Moore & Son, Detroit	3 00
2d do., Mrs. E. Moore & Son, Detroit	2 00
Best display of wax flowers, Mrs. F. Bethel	2 00
2d do., Miss Hattie M. Chandler	1 00
Best display of fruit in wax, Mrs. E. Moore & Son, Detroit	3 00
2d do., Miss Alice V. Adair, Utica, Mich.	2 00
Best artificial flowers in silk, muslin, paper, or feathers, each, Mrs. A. J. Brow, Detroit	2 00
2d do., Miss Emma Krehwisch, Roseville, Macomb county	1 00
Ornamental shell work, Mrs. S. Jennings, Detroit, 2d premium	1 00
Best shell frame, Wm. F. Kelley, Pontiac	2 00
Best wreath of shells, Mrs. Mary A. Danahey, Detroit	2 00
Best wreath of seeds, Mary Van Hayse, Detroit	2 00
Best wreath of dried grasses and plants, Miss Clara A. Peacock, Pontiac	2 00
2d do., C. W. Bradley, New Buffalo	1 00
Best bouquet of dried grasses and plants, Wm. Adair & Co., Detroit	2 00
2d do., Mrs. S. Jennings, Detroit	1 00
Specimen of fancy leather work, Mrs. S. Jennings, Detroit, 2d premium	1 00
Best display of hair dressers' work, Mrs. R. W. Allen, Detroit	3 00
2d do., J. Smith, Lawton	2 00

MRS. WM. ADAIR,
MRS. ASHLEY POND,
MRS. RUSSELL,
Viewing Committee.

DIVISION N—MISCELLANEOUS.

CLASS 66.

Best collection of marble, Probasco & Rumney, Detroit	$5 00
Best collection fire brick, H. Heames & Son, Detroit	3 00
Best barrel stone lime, A. D. F. Noble, Detroit	2 00
Best barrel stucco, A. D. F. Noble	2 00
Best specimen ground bone, Northwestern Fertilizing Co., Chicago	5 00
Best barrel fine salt, Oscoda Salt & Lumber Co., Detroit	3 00
Best barrel packers' salt, A. D. F. Noble	3 00
Best sample table salt, Oscoda Salt Co.	3 00
Best barrel fine kettle salt, A. D. F. Noble	3 00
Best barrel solar salt, A. D. F. Noble	3 00
Best wrought iron fence, E. T. Barnum, Detroit	5 00
Best barrel ground plaster, A. D. F. Noble	2 00
Best artificial stone, Milo A. Smith, Detroit	2 00

FRANKLIN WELLS,
S. O. KNAPP,
A. D. HALL,
Viewing Committee.

DIVISION O.

CLASS 67—CHILDREN'S DEPARTMENT.

Two decorated vases, Sylvester Larned, Detroit	$1 00
One crayon portrait, Harry V. Woodhouse, Detroit	3 00
One crayon sketch, Mary Faltes, Detroit	1 00
Wax flowers, Johnnie Moore, Detroit	2 00
Wax wreath, Fred Mansfield, 8 years old, Flint	2 00
Silk footstool, Willie T. Cheever, Ann Arbor	3 00
Silk flowers, Mary & A. Laitner, Detroit	1 00
Pair white wool stockings by girl 12 years old, Thomas Langley, Greenfield.	1 00
Tidy for chairs and spectacle case, G. R. Thomas, Detroit	3 00
Man's shirt, Belle Saunders, Detroit	5 00
Lace ends, Belle Saunders, Detroit	2 00

Set 3 pieces spatter work, Miss W. J. Gibson, Detroit	$1 00
Sample hand sewing, Mrs. W. Gibson, Detroit	1 00
Lawn dress by child 12 years old, Mrs. Mary A. Proctor, West End, Springwells	2 00
Match safe, Estella Root, Detroit	1 00
Calendar, Willie Cheever, Ann Arbor	1 00
Landscape in oil, Estella Root, Detroit	1 00
Calico patchwork quilt, Mrs. Clara Sundey, West end	1 00
Calico bed quilt, Dwight Cheever, Ann Arbor	1 00
Collection of blocks for games, F. F. Humphrey, Saline, 5 years old	3 00
Swiss clock, scroll sawing, Dwight Cheever, Ann Arbor	2 00
Two baskets, scroll sawing, Willie Juglis, 12 years old, Detroit	2 00
Two wall match safes, scroll sawing, Willie Juglis, Detroit	3 00
Sofa pillow, Willie S. Cheever, Ann Arbor	1 00
Worsted comforter, Miss Mary M. Chilson, Battle Creek	1 00
Sofa pillows, Mrs. Mary Faltis, Detroit	1 00
Toilet cushion, Miss Mary Faltis	1 00
Painting water colors, Miss Mary Faltis	1 00
Canvas tidy, Ernestine Krolick, 10 years old, Detroit	1 00
Canvas stand and spread, Ernestine Krolick	1 00
One pair coral lamp mats, Ernestine Krolick	1 00
Hanging basket, Mrs. C. C. Randall, Detroit	1 00
Needle work, Carrie M. Hart, 9 years old, Milton	1 00
Basket exotic leaves, Johnnie Moore, Detroit	1 00
One can of plums, G. W. Prescott, Grand Rapids	50

MRS. A. H. WILLIAMS,
MISS MAMIE BROW,
Viewing Committee.

DISCRETIONARY.

The entries enumerated below, to which no money or other premium has been awarded, have been deemed worthy of special mention by the special committee to whom the premiums awarded were referred:

NOT ENUMERATED AND WORTHY OF SPECIAL MENTION.

Pair matched ponies, J. H. Andrews, Detroit	$15 00
Pair draught horses, Clark Bros., Saline	20 00
Sofa cover knitted, Miss Pauline Rudolph, Detroit	1 00
Bushel white beans, H. B. Chapman, Reading	2 00
Collection of millet, grasses, amber sugar cane, pampas rice, flax, chestnut in fur, David Woodman, Paw Paw	5 00
93 varieties of potatoes, Wm. L. Walters, Utica, Mich.	5 00
7 samples do., E. H. Wurtz, East Saginaw	3 00
2 samples artichokes, E. H. Wurtz, East Saginaw	......
1 collection of potatoes, Wm. L. Walters, Utica, Mich.	......
12-headed egg plant, millet, H. B. Chapman, Reading	......
Garlic, salsify, Egyptian rice corn, flat head Dutch cabbage, Marblehead cabbage, brown corn, collection potatoes, artichokes, Italian artichokes, varieties of potatoes, David Geddes, Saginaw City	......

DIVISION E—CLASS 31.

Pair brown leghorn chickens, W. H. Clark & Co., Detroit	......
Pair golden Polish fowls, C. M. Page, South Fairfield	......
Pair silver spangled Hamburg, Hayes & McElwain, Hastings	......
Coop of four hens, James Reed, Detroit	......
Two coops of cochin hens, pair spangled Polish, Hayes & McElwain, Hastings	......
Two pair brown red game, Curtis & Clark, Monroe	......
Pair hen feather, white, Fred C. Whitney, Detroit	......
Pair white pyle games, Curtis, Clark & Co., Monroe	......
Pair white pyle games, Fred C. Whitney, Detroit	......
Pair penciled Hamburg, pair black Hamburg, Hayes & McElwain, Hastings	......
Pair black Hamburgs, John Mahoney, Detroit	......
Pair frizzles, W. A. Holcomb, Francisco	......
Pair black rumplers, pair black Javas, W. S. Jones, Owosso	......

Pair Japanese bantams, Hayes & McElwain, Hastings	......
Pair brown red game, pair ginger red game, pair red pyle game, pair white pyle game, pair blue pyle game, pair rose comb game, Curtis, Clark & Co., Monroe	......
Pair penciled Hamburgs, pair black Hamburgs, Hayes & McElwain, Hastings	......
Pair black Hamburgs, Curtis, Clark & Co., Monroe	......
Pair black Javas, W. S. Jones, Owosso	......
Pair Japanese bantams, Hayes & McElwain, Hastings	......
Pair Jefferson Co. blue ducks, Wm. A. Holcomb, Francisco	......
Pair wood ducks, Ambrose Purchase, Auburn	......
Two pair Himalaya rabbits, Wm. A. Holcomb	......
Collection of wild birds' eggs, E. A. Cadwell, Jr., Detroit	......
Pair Guinea pigs, pair ferrets, Fisher & Hammond, Ann Arbor	......
Pair Dutch rabbits, Wm. A. Holcomb, Francisco	......

DIVISION G—CLASS 36.

Gallon maple syrup, J. M. Blower, Lawrence, Mich	......
Ten lbs. maple sugar, M. Green, Farmington	......
Case comb honey, G. W. Long, Dearborn	......
Specimen extracted honey, A. D. Benham, Olivet	......
Specimen bees wax, Wm. Thompson, Detroit	......
Specimen artificial comb honey, A. D. Benham, Olivet	......
Wax extractor, specimen bee smoker, 5 specimens for smoker, display of apiaran goods and implements, apparatus, etc., H. D. Cutting, Clinton	......
Honey extractor, Wm. Thompson, Detroit	......
Three loaves salt rising bread, Clara Peacock, Pontiac	......
Three loaves yeast rising bread, Mrs. R. Stage, Pontiac	......
Soda rising bread, Mrs. A. McClary, Galesburg	......
Corn rising bread, Mrs. M. Leslie, Dearborn	......
Display of pickled vegetables, L. C. Lincoln, Greenville	......
Display pickled vegetables, Mrs. T. V. Aldrich, Armada	......
Best display of toilet tooth soap, Casper Shulte, Detroit	......
Display of confectionary and pop corn, A. B. Lee & Co., Detroit	......
Display of flavoring extracts, C. M. Burke, Detroit	......
Case ornamental confectionery, A. Bader, Detroit	......
Display flavoring extracts, display baking powders, John Davis, Detroit	......
Display baking powders, James Paret & Co., Detroit	......
Twin Bros. dry hop yeast, Waterloo Yeast Co., Detroit	......
Dry hop yeast, Judd Bros. Yeast Co., Detroit	......
Display wine vinegar, white wine vinegar, cider vinegar, malt vinegar, Edward Stage	......
National yeast cake, National Yeast Co., Seneca Falls, N. Y.	......
Display compressed yeast, J. F. Lobdell, Detroit	......
Display pearline yeast, James Pyle, New York	......
Display Colgate's honey soap, Thomas Burton, New York	......

DIVISION H—CLASS 45.

Post hole digger, hedge shearer, W. S. Penfield, Detroit	......
Patent frame erector, S. R. King, Mason	......
Sod cutter, C. A. St. Aubin, Detroit	......
Set 3 horse eveners, J. Mitchell, Oxford	......
Display farm bells, Lusk & Co., Jackson	......
Collection of cultivators, W. S. Penfield, Detroit	......
Pruning hook, E. Frink, Dana, Ill	......
Lifting jack, O. N. Woodward, Hadley	......
Combined bag holder and tuck, M. D. Hamilton, Monroe	......
Bale of hay, P. K. Dederick & Co., Albany, N. Y.	......
Star fluting machine, C. R. Mabley, Detroit	$0 50
Wire bucket, C. M. Whitehead, Pontiac	50
Cooley patent Creamer, floating thermometer, F. S. Finley, Ypsilanti	......
Grape picker, rotary knife, peach and apples, Copland, Detroit	......
Family fruit dryer, McDonnell Ewer, Romeo	......
Carriage jack, Milburn Wagon Co., Toledo, Ohio	......
Display of bycicle velocipede, John Shire, Detroit	......
Bent front and rear wagon hound, Hall & Co., Detroit	......

One horse plow, one sulky plow, one rolling plow coulter, best adjustable beam, one plow wheel, sample chilled iron, plow for marsh plowing, Gale Manufacturing Co., Albion	
One hand plow, No. 77, one do., C. O. C., W. S. Penfield, Detroit	
Steel sulky plow, Kloppel & Martin, Ida	
Plow sulky, Lawrence & Chapin, Kalamazoo	
One W. S. plow, W. S. Penfield, Detroit	
Plow wheel, Dodge Plow Co., Kalamazoo	
Sulky plow, P. P. Mast & Co., Springfield, Ohio	
Furst, Bradley & Co., sulky plow, Furst, Bradley & Co., Chicago, Ill.	
Combined grist mill and corn sheller, W. S. Penfield, Detroit	$5 00

DIVISION J—CLASS 48.

Best flue scraper and cleaner, E. T. Barnum, Detroit	Diploma
Best portable steam engine, W. S. Wormer & Sons, Detroit	
Machine for champering and crozing staves, Gardner & Stephenson, Northville	Medal
Best power press for sheet metal work, C. Puddefoot, Detroit	Medal
Display of machinery for boots and shoes, Pingree & Smith, Detroit,	Dip. and Medal
Window sash holder and fixture, J. W. & M. M. Wharf, Detroit	
Patent pressure blower, display coffee mills, band saw, stave knife, injector, display of chucks, G. S. Wormer & Sons	Deploma and Medal
Brick and tile machine combined, J. W. Penfield, Willougby, Ohio	Diploma
Saw filer and gummer, S. P. Olney, Detroit	Medal

DIVISION K—CLASS 52.

Fur hearth rug, Barclay & Black, Detroit	$1 00
Five fancy door mats, Barclay & Black, Detroit	1 00
Display of window curtains, Barclay & Black, Detroit	1 00
Display of school furniture, Michigan School Furniture Co., Detroit	
Carved wood work, N. Brocius, Detroit	
One music stand, carved flower stand, one wooden mantel, C. Weber, Detroit	
Invalid elevator, Mrs. A. B. Mainwaring, Detroit	
Two toy chariots, Otto Weber, boy 11 years old, Detroit	
Teacher's desk and folding table, Kappe F. F. & S. D. Co., Detroit	
One combination desk, fifteen cane chairs, Horace Turner, Detroit	
Collection iron plant stands, Wm. Adair & Co., Detroit	
Display marbleized mantels, P. A. Billings, Detroit	1 00
Display brass fenders, P. A. Billings, Detroit	2 00
Display brass shovels and tongs, P. A. Billings, Detroit	2 00
Display fancy coal vases, Jas. L. Fisher, Detroit	2 00
Display 5 fancy tired irons, James L. Fisher, Detroit	1 00
Display 5 brass fire sets, James L. Fisher, Detroit	2 00
Two brass coal vases, Jas. L. Fisher, Detroit	2 00
Gasoline stove, Wm. F. Reynolds, Detroit	2 00
Gas fixtures, chandeliers, Combination Gas Machine Co., Detroit	2 00
300 light machine in operation, Combination Gas Machine Co.	4 00
10 light machine in operation, Combination Gas Machine Co., Detroit	2 00
15 light machine in operation, Combination Gas Machine Co.	2 00
One iron bracket, D. E. Baer, Detroit	1 00
Display of parlor grates, P. A. Billings	1 00
2 fire fronts, nickel trimmed, Probasco & Rumney, Detroit	1 00
Collection rustic stands, Wm. Adair & Co., Detroit	1 00

DIVISION L—CLASS 57.

Display of optical instruments, L. Black, Detroit	1 00
Set drawing instruments, L. Black & Co., Detroit	Diploma
Artificial teeth, W. H. Kessler, Detroit	1 00
Teeth on rubber, W. H. Kessler, Detroit	1 00
Display of dental work, W. H. Kessler, Detroit	1 00
Adjustable splints for legs, David Bissell, Detroit	Diploma
Adjustable splints for arms, David Bissell, Detroit	2 00
Adjustable splints for hands, David Bissell, Detroit	1 00
Display of spectacles, M. S. Smith & Co., Detroit	1 00
Music chart, Prof. Rice, G. S., Detroit	1 00
Best display sewing machines, Howe Machine Co., Detroit	2 00

White Sewing Machine, John Schafer, Detroit	$1 00
Display of silver or plated ware, M. S. Smith, Detroit	5 00
Best case of jewelry, Albert Fisher, Detroit	3 00
Large clock, "Centennial," Wm. Fisher, Jr., Detroit	3 00
Chickering concert G. piano, C. J. Whitney, Detroit	Diploma
Chickering upright, C. J. Whitney, Detroit	2 00
Five Estey organs, Cottage, C. J. Whitney, Detroit	1 00
Display of model of human eye, M. S. Smith & Co., Detroit	1 00
Six family sewing machines, Singer Manufacturing Co., Detroit	3 00
Display of pianos, J. Becker & Son, Detroit	Diploma
issell's champion boot-leg turner, David Bissell, Detroit	1 00
Bissell's improved bevel square, David Bissell, Detroit	1 00
atent toe and side weight for horse, Albert Fisher, Detroit	1 00
Two cabinet organs, I. H. Hirch & Co., Detroit	1 00
Holman liver pad, A. D. Allen, Detroit	1 00
Acoustic telephone for business purposes, Business Telephone Co., Detroit	2 00
Display of Japanese goods, Louis Black & Co., Detroit	1 00
White bronze bas relief, "Rock of Ages," Eakins & Co., Detroit	Diploma
One combination organ, Clough & Warren Organ Co., Detroit	Diploma
One combination centennial pipe top, Clough & Warren Organ Co.	Diploma
Hazelton upright piano, R. D. Bullock, Jackson	Diploma
One Ernst Gobler square piano, R. D. Bullock, Jackson	Diploma and $1 00
Two Smith American organs, R. D. Bullock, Jackson	2 00
Set teeth in celluloid plate, Dr. G. B. Watkins, Detroit	1 00

None of the above articles are enumerated on the Society's premium list, and in Division L, Class 57, no money premiums are to be awarded, parties being entitled, if found worthy, to diploma only. The committee, however, awarded money premiums to exhibitors in above list, which will be found appended in the proper places.

A. C. WORTLEY,
FRANK A. APEL,
F. C. PINGREE,
Viewing Committee.

CLASS 59.

Landscape in oil, morning, Mrs. W. W. Antisdel, Detroit	$1 00
Maine scene in oil, Chas. H. Eaton, Holly	1 00
Bird piece in oil, A. G. Comstock, Detroit	1 00
Painting, Margareta Pustel, A. J. Brow, Detroit	2 00
Collection paintings, 5 in number, Robt. Hopkins, Detroit	5 00
Collection oil paintings, 5 in number, Chas. H. Eaton, Holly	3 00
Pencil drawings, landscape, Fanny McGowan, Detroit	1 00
Model house drawing, A. C. Varney, Detroit	3 00
Oil painted toilet set, Miss S. Kelley, Detroit	2 00
Collection decorated pottery, R. W. King, Detroit	5 00
Pastel painting, marine view, Miss C. Robinson, Detroit	2 00
Pair bottles, water color on silk, Miss C. Robinson, Detroit	2 00
Pin cushion, water color on silk, Miss C. Robinson, Detroit	1 00
Ornamental glass, Edward F. Lee, Detroit	3 00
Cottage monumental draped urn, Wm. Schulties, Detroit	3 00
Roman Column, Wm. Schulties, Detroit	3 00
Cottage monumental urn, Wm. Schulties, Detroit	3 00
Display of penmanship, W. F. Parsons, Kalamazoo	Diploma
Crayon drawing, the knotty point, S. G. Haywood, Ypsilanti	2 00
Pen and ink drawing, Walter McFarland, Detroit	2 00
Business and ornamental penmanship, J. H. Goldsmith, Detroit	Diploma
Roman crystal type painting, Mrs. Ferguson	1 00
Mayhew University book-keeping and actual business practice, Ira Mayhew	Diploma
Pictures by girl who wrote with both hands at same time, Fanny McGowan, Detroit	3 00
Hand-sawed frame, Maggie E. Chambers, Detroit	1 00
Collection plaster ornaments, Geo. Hanley, Detroit	3 00
Collection plaster stationery, Geo. Hanley, Detroit	2 00
Specimen stone and metal seal engraving, Thos. A. Wilkinson, Detroit	3 00
Specimen mineral painted plate, Mrs. R. Wagner, Detroit	2 00
Painted shells in oil, Mrs. C. Robinson, Detroit	2 00
White bronze bas relief, Eakins & Co., Detroit	3 00

Glove and handkerchief box in scroll work, Miss C. Robinson, Detroit	$2 00
Picture frames, satin and gold, etc., Marcus Stevens, Detroit	3 00
Collection crayon drawings, J. E. Watson, Detroit	3 00
Collection of statuary in composition, R. W. King & Son, Detroit	3 00

HENRY B. BROWN,
HENRY W. ROGERS,
JOSEPH SILL,
WM. JENNISON,
Viewing Committee.

CLASS 60.

Greatest display of ladies' dress goods, C. H. Dickerson, Detroit	$2 00
Hoop skirt, C. H. Curtis, Detroit	......
One contile corset, Miss C. Kohler, Detroit	2 00
One child's waist, Miss C. Kohler, Detroit	1 00
Case of butterflies, G. Heine, Detroit	2 00
Display of ostrich feathers, S. Contellier, Detroit	2 00

CLASS 61.

Specimen plain needle work, Miss Pauline Rudolph, Detroit	3 00
Calico patchwork quilt by hand, Miss Fanny Haggerty, West End	2 00
Two pieces of ornamental stitching in gold frames, Mary F. Palmer, Detroit	3 00
Worsted Mats, Mrs. E. R. Olds, Hartford	1 00
Silk patchwork sofa pillow, Alice J. Richmond, Detroit	1 00
Specimen hem stitching, H. B. Chapman, Reading	1 00
Calico dress, hand made, Mrs. M. W. Clark, Parma	50
Chair cushion, Mrs. Ceba Garner, Monroe	50
Crochet tidy, Miss Pauline Rudolph, Detroit	50
Specimen plain needle work, Mrs. C. G. Hampton, Detroit	2 00
Fine skirtfall, by hand, Clara Peacock, Pontiac	1 00
Silk quilt, hand work, Miss Pilkin, Detroit	2 00
Silk quilt, patchwork, by hand, Mrs. W. T. Lewis, Pontiac	2 00
Patchwork quilt, 10,516 pieces, Mrs. R. F. Bruce, Detroit	1 00
Knitted bed spread, Pauline Rudolph, Detroit	2 00
Pair pillow shams, Bertha Lucas, Detroit	1 00
Fine shirt, machine made, Elizabeth Farren, Detroit	2 00
Skirt, machine made, Mamie Wellington, Detroit	1 00
Best and largest collection of ornamental needlework or embroidery done by one person, Mrs. M. C. Selby, Detroit	8 00
Specimen of embroidered infant's dress or skirt in cotton or linen, Mrs. Geo. Finnister, Detroit	2 00
Specimen Honiton lace work, Jenny Clark, Detroit	2 00
Sample embroidered bracket, C. Robinson, Detroit	$2 00
Specimen crewel embroidery, Madam Hude, Detroit	2 00
Foot-rest crewel embroidery, C. A. Worthington, Detroit	1 00
Worsted picture flowers, Mary Vignace, Greenfield	2 00
Worsted picture flowers, Mrs. F. Ulrich, Detroit	2 00
Point applique embroidered cretonne window lambrequins, R. Wagner, Detroit	3 00
Floor rug in worsted, A. Armstrong, Detroit	2 00
Infant's bib crochet, G. L. Sampson, Detroit	1 00
Worsted tidy, M. W. Clark, Detroit	1 00
Sample fancy scroll work, J. H. Hoffner, Detroit	2 00
Picture in silk, Lizzie Andrews, Detroit	3 00
Collection of silk and cotton embroidery by one person, Mrs. D. Burrows, Detroit	5 00

CLASS 62.

Oil painted screen, S. Larned, Detroit	3 00
Lace handkerchief, Kate Skinner, Ontonagon	1 00
Lace necklace, Kate Skinner, Ontonagon	2 00
Lace head dress, Kate Skinner, Ontonagon	50
Point lace barb, Maggie E. Chalmers, Detroit	2 00
Point lace handkerchief, Maggie E. Chalmers	2 00
Suit underwear, Madam Hude, Detroit	2 00
Antique lace pillow sham, S. Kelly, Detroit	2 00

Worsted wreath, Miss Horn, Detroit	$1 00
Splint or straw settee, Clara Sumley, West End	1 00
Worsted embroidery for music rack, Mrs. Geo. Doty, Detroit	1 00
Lace work, infant's bonnet, Mrs. A. C. Schmitt, Detroit	2 00
Turkish rug raised embroidery, C. Robinson, Detroit	2 00
Embroidered ottoman in wool and beads, Mrs. R. Wagner, Detroit	1 00
Pair decorated whisk-holders, Mrs. R. Wagner	2 00
Dorsal hanging, applique, Mrs. Seth Smith, Detroit	2 00
Specimen embroidered pillow-covers, Mrs. R. R. Mattison, Detroit	2 00
Mixed hearth rug, D. K. Halsey, South Saginaw	2 00

MRS. EMORY WENDELL,
MRS. L. E. CLARK,
MRS. E. S. HEINEMAN,
Viewing Committee.

CLASS 63.

Afghan robe, Mrs. J. R. Haliburton, Detroit	$1 00
Afghan robe, S. B. Bickell, Detroit	2 00
Afghan robe, A. Chappell, Detroit	1 00
Cotton tidy, W. F. Elliott, Detroit	50
Cotton tidy, Miss S. Kelly, Detroit	50
Crochet bed spread, John George	1 00
Crochet bed spread, Mrs. R. Stage, Pontiac	2 00
Pair silk gloves, crochet, Mrs. Truman Phelps, Detroit	1 00
Knitted cuffs, 6 pairs, Miss Dora C. Pease, Wayne	1 00
Ladies' crochet boots, etc., Mrs. J. R. Haliburton, Detroit	3 00
Towel rack, Madam Hude, Detroit	1 00
Child's crib, Madam Hude, Detroit	1 00
Oil painted towel rack, Miss S. Kelly, Detroit	1 00
Match safe, Miss S. Kelly, Detroit	50
Brush and comb, Miss S. Kelly, Detroit	2 00
Velvet sofa pillow, Miss Maggie Sheehey, Detroit	2 00
Bead work embroidery, Miss Maggie Sheehey, Detroit	1 00
Hand lace quilt, Miss C. Robinson, Detroit	1 00
Two crochet collars, Mrs. M. W. Clark, Parma	50
Wreath on bristol board, M. W. Clark, Parma	50
Lamp screen, M. W. Clark, Parma	50
5 knit tidies and mats, Mrs. S. Ashley, Detroit	50

MRS. ELISHA TAYLOR,
MRS. J. S. FARRAND,
MRS. A. J. BROW,
Viewing Committee.

CLASS 64.

Medallions in wax, Mrs. E. Moore & Son, Detroit	$1 00
White rosettes in wax, Mrs. E. Moore & Son, Detroit	1 00
Specimen white transparent wax, Hattie M. Chandler, Detroit	2 00
Best display wax flowers, Mrs. Jennings, Detroit	2 00
2d do., Miss Ballery, Detroit	1 00
Best display wax work, Mrs. Jennings, Detroit	2 00
Artificial flowers in feathers, Miss Mary Bloss, Roseville	2 00
Wreath in feathers, Mrs. Van Duzen, Detroit	1 00
Natural cold flowers preserved, Mrs. E. A. Burley, Detroit	2 00
Michigan insects, J. E. Warren, Detroit	2 00
Foreign insects, J. E. Warren, Detroit	2 00
Moss landscape, Mrs. S. Jennings, Detroit	2 00
Skeleton leaves, Mrs. S. Jennings, Detroit	2 00
Cross of flowers, Miss Bailey, Detroit	3 00
Display, funeral designs, Mrs. Burley, Detroit	2 00
Natural flowers preserved, Mrs. E. Moore, Detroit	2 00
Collection of embalmed flowers, Miss Hattie Chandler, Detroit	2 00

WILLIAM ADAIR,
MRS. ASHLEY POND,
MRS. A. RUSSELL,
Viewing Committee.

CLASS 66.

Monumental marble, J. Kinney & Co., Detroit	$4 00
Barrel superphosphate, Michigan Carbon Works	4 00
Drain tile, H. Weston, Pontiac	3 00
Specimen wood turning, A. J. Fitch, Madison, Ohio	2 00
Gomes patent door knob, Potter & Copeland, Detroit	1 00
Combined lantern and pail, Potter & Copeland, Detroit	1 00
Electric kerosene burner, Potter & Copeland, Detroit	1 00
Gears, butts, Potter & Copeland, Detroit	1 00
Automatic screen, Landers & Donavan, Flint	1 00
Collection electrotypes, Detroit Free Press, Detroit	Medal
Collection stereotypes, Detroit Free Press, Detroit	1 00
Best equipped office, Detroit Free Press, Detroit	Diploma
Carpenters' extension pole, Jarvis Bigelow, Flint	1 00
Revolving head-light, Peter N. Begin, Detroit	Diploma
Display of bungs, Thos. R. Forsyth, Detroit	1 00
Case horse shoes, J. S. Freeman, Flint	4 00
One four-oared barge, Dean & Co., Detroit	4 00
Ashton Liverpool salt, Hutchins & Co., Detroit	2 00
Case of minerals, Gustave Deniel, Detroit	5 00
Case of glass balls, Ira A. Paine, Detroit	1 00
Specimen white coral, Lewis J. D. Berg, Detroit	1 00
Printing paper in rolls, Detroit Paper Co., Detroit	2 00
Roofing felt, Detroit Paper Co., Detroit	1 00
Building paper, Detroit Paper Co., Detroit	1 00
Roller composition, Detroit Paper Co., Detroit	1 00
Wood type, Detroit Paper Co., Detroit	1 00
Collection bungs and plugs, John Bowen, Detroit	2 00
Show case hardware, J. L. Fisher, Detroit	Diploma
Display roofing, G. A. Gatwold, Pen Argyle, Pa.	1 00
Display slate, E. R. Davis, Detroit	1 00
Miniature grain elevator, E. D. Davis, Detroit	1 00
Display liquid paints, S. H. Hart & Co., Detroit	Medal
Five deer heads, Moses Dungrow, Detroit	2 00
Boat model, Moses Dungrow, Detroit	1 00
Improvement in roofing, N. H. Brown, Detroit	2 00
Display furniture, E. T. Barnum, Detroit	1 00
Ten-oared barge, Chas. Plass, Detroit	Medal
Whiffletree guard, J. W. Marsh, Salem	1 00
Burglar sash lock, Jno. D. Geagley, Hudson	1 00
Best display of earthen and terra cotta ware, T. S. Balsey, Detroit	Medal

FRANKLIN WELLS,
S. O. KNAPP,
A. D. HALL,
Viewing Committee.

The Special Committee to whom were referred all the recommendations of Judges and Superintendents for discretionary premiums, would respectfully report: That they have carefully examined the list of such recommended premiums furnished by the Secretary, and have found great difficulty in arriving at any satisfactory decision, for the reason that in many instances no amounts are ever suggested, and in other cases the amount is merely suggested by saying we recommend a first, second, third, or fourth premium, naming no amount, and premiums of each description in the division and class, varying largely in amount, so that such designation furnished no intelligible guide. Again, in many cases diplomas are recommended, when, from the character of the exhibit, if a money premium had been recommended, it is evident that from $1 to $5 would have been the limit of the recommendation. It will be remembered that the diploma of this Society represents a premium in no case of a money value of less than $25, and we cannot consent by such awards of diplomas, as are in many cases recommended, to cheapen, discredit, and render nearly or quite valueless this evidence of the Society's appreciation of exhibits at its Fairs. Laboring under these disadvantages, your committee cannot flatter themselves that they will in all cases have arrived at conclusions just to either exhibitors, superintendents or committees, who have made such recommendations, and much less at conclusions satisfactory to exhibitors, but they have endeavored carefully, laboriously, and conscientiously to perform the duty assigned them.

Among the recommendations of the Viewing Committees, which we have not deemed it advisable to concur in, are two or three which require more than a passing notice.

The Combination Gas Manufacturing Company made an exhibit of gas fixtures, chandeliers, etc., and of several machines in operation, furnishing light for the hall, etc.; and the committee recommended in addition to $10 in money and a medal, a cash premium of $25. Your Committee regard the $10 money award and the medal of the Society as a suitable and sufficient recognition, the space furnished and the opportunity of advertising by allowing the machines to be exhibited in actual operation in one of our principal halls, being all that was asked or expected by the exhibitor. Messrs. G. S. Wormer & Sons, as has been their custom for years, made a very large and valuable exhibit of machinery, tools, etc., attracting great attention and adding very much to the completeness of the exhibits in that department, and the Viewing Committee recommended a money award of $50. Messrs. Pingree & Smith erected at their own expense on the grounds set apart for their use by the Society, a building, and supplied it with suitable machinery for the purpose, for the manufacture of boots and shoes, and kept it open for inspection, with 35 operatives constantly employed during the entire Fair. This enterprise was new, very instructive, and added very much to the attractions and completeness of the Fair. The Viewing Committee recommended a money premium of $75.

Your Committee do not underestimate or undervalue either of the exhibits above named, but on the contrary would specially acknowledge our obligations to the gentlemen for their respective exhibits. The well known character and standing of both these parties, and our appreciation of the motives and public spirit that induced them to make their valuable contributions to the Fair, induce us to believe that a money award would be exceedingly distasteful to them, and that they will appreciate and value as a much more suitable recognition of their efforts in behalf of the Society the medal and diploma of the Society, which we have in each case recommended.

There are other special exhibits such as the printing press, electrotyping process, etc., by the Free Press Company; the exhibits of M. S. Smith & Co., E. B. Smith & Co., and Richmond & Backus. The northern exhibit, so-called, and numerous others called for special mention, but time and space will not permit, and we trust the awards of diplomas, medals, etc., will be regarded as due recognition.

In the lists furnished us it is somewhat difficult to discriminate at times between articles, animals, etc., which are designed to be noticed by honorable mention, and especially worthy, interesting, etc., and those intended to be recommended for a premium. We have so far as possible consulted with Superintendents of different departments, learned, if possible, the intention of the Viewing Committees, and while not always coinciding entirely with Superintendents of departments as to the propriety of awards, we have given great deference to their opinions. There were recommended for special mention or premiums 521 different exhibits.

Premiums over and above those offered or awarded were recommended as follows:

In money	$977 00
Twenty-six medals, valued at	260 00
Eighty-four diplomas, valued at	2,100 00
Making a total of	$2,337 00

We have recommended the award of an amount in the aggregate as follows:

Money premiums	$386 50
Twelve medals, valued at	120 00
Thirty-two diplomas, valued at	810 00
In the aggregate	$1,316 50

The exhibits on which we recommend premiums, and the character and amount of premiums are mentioned above. All articles or exhibits not so named are commended as worthy of special notice, and will be so published. The word "Discretionary" indicates that the exhibit is of a kind for which premiums were offered and awarded and additional premiums were recommended. "Non-enumerated" indicates that no premiums were offered, but the exhibit was such as to be entitled to a premium.

DIVISION E—CLASS 31.

In this entire class and division the recommendations seem to us only recommending duplicate premiums, that is two first and two second premiums in each case when recommended. But at lowest, amounts (no amounts being named, but recommendations being first premium and second premium in each case) would amount to $60. It may be an error in copying lists for us, and if the special discretionary premiums only in fact amount to $11, as stated by the Superintendent of this department in his report, we would coincide in his recommendation that the amounts be paid; but as shown in copy of recommendations presented to us, we must recommend that the entire class be passed without any discretionary awards.

Your committee would remark, that the commendable efforts of viewing committees and superintendents to secure notice of all articles exhibited deserves especial notice; and if in their earnest desire that no meritorious exhibit should be overlooked, they have recommended premiums in such number and amount that the funds of the Society and justice to successful competitors for regularly offered premiums require careful scrutiny and judicious curtailment at our hands, their thoroughness, zeal, and earnest desire to give universal satisfaction deserve commendation. Your committee feel impelled, however, to urge upon Superintendents in charge a careful examination of the books of viewing committees after their work of examination is completed, and before cards or ribbons are given out, that expectation may not be raised of receiving premiums, which must inevitably be disappointed. In some whole classes, and even divisions, this does not appear to have been done at our last exhibition, and every article exhibited, or nearly so, that an omission is the exception and not the rule, has been recommended for special or discretionary premiums, to an amount in many cases larger than the market value of the exhibit.

This must, necessarily, lead to a good deal of disappointment, and in many cases, no doubt, to an impression that exhibitors have not been treated with proper consideration and respect.

Respectfully submitted,

W. J. BAXTER,
J. M. STERLING,
HENRY FRALICK,
Committee.

APPENDIX A.

REPORT OF VISIT TO STATE AGRICULTURAL COLLEGE, JUNE 25, 1879.

During the winter meeting of the Executive Committee of the State Agricultural Society an invitation was received by the State Board of Agriculture to visit the college during the month of June. The time chosen was the 25th of that month, and on that day quite a number of visitors assembled. On the part of the State society there were present the President, W. L. Webber; R. F. Johnstone, Secretary; J. M. Sterling, Monroe; Henry Fralick, Grand Rapids; A. O. Hyde, Marshall; F. M. Manning, Albion; H. O. Hanford, Plymouth; A. F. Wood, Mason: J. Q. A. Burrington, Vassar; F. D. Dewey, Owosso; W. H. Cobb, Kalamazoo; Philo Parsons, Detroit; Wm. Ball, Hamburg; and W. G. Beckwith, Cassopolis. The members of the Board of Agriculture who received them were: Hon. J. Webster Childs, Geo. W. Phillips, Mr. Reynolds of Grand Traverse, M. G. Gard of Volinia, and Mr. Wells of Constantine. The president of the college, Mr. Abbot, received the party in the parlors of the college hall.

The officers of the State Grange were also invited guests at the same time, and were also received. Among them were the Hon. John J. Woodman, the Master of the State Grange, S. T. Cobb, Secretary, and the Hon. Mr. Luce of Coldwater.

After some conversation, it being about 11 A. M., the guests were invited in a body to visit the laboratory, where Dr. Kedzie was employed with his classes. The midsummer sun made it excessively hot, and as a large number of the members are men of over 200 pounds weight, their movements were quite leisurely. We were met at the door of the lecture room of the laboratory by Dr. Kedzie. Here he had his own special analytical work going on, amongst which, at the present time, was the examination of the waters, sent from about thirty wells, to find out which was the least liable to incrust the boilers of locomotives, that the Grand Rapids and Indiana Railroad Company might learn which were the most available points for sinking their wells and erecting their tanks for a supply of water on the line north to Petoskey. Dr. Kedzie's private laboratory had been given up to the students He had even been driven to fix up a temporary place of work for a student in the cellar. Every work-stand in the long hall was filled with students at the actual work of gaining a practical knowledge of this science. There was one young lady among them, who seemed as earnest and studious as any of them. The young men hardly looked up as the body of visitors filed into the room. One of the propositions before the Legislature the past winter was an appropriation to build an addition to it, so that its capacity might be doubled. It was very evident to us, and in fact there was not a single negative voice on the subject, that the Legislature had neglected a known duty in not granting the request of the Board. This study is the basis of an agricultural education. Here it is expected that every student shall be occupied for four terms of the full period he remains at the college. The want of accommodation here strikes at the usefulness of the institution and is an injustice to the whole body of students as well as to the faculty. Nothing short of ignorance and prejudice the most profound could have denied the appropriation which was so earnestly and sincerely sought for, and which it is evident was needed us an act of justice to the students and the school, even more than to the professor and the faculty which have labored so faithfully to make the college the first of its kind in the United States, and sustaining a reputation in Europe as being remarkable for its success. Professor Kedzie displayed the several soils which he had analyzed during the past year, and of which he had made a most valuable report, which is to appear in the next volume of the Transactions of the Board of Agriculture.

Leaving this laboratory and its busy students and hard-worked professor, we crossed over the grounds to the new and neat but rather quaint looking boarding hall. Here we found one of the young men in the armory, which was furnished with muskets in the racks along the wall. The armory is in the basement, and was cool in comparison with the outside atmosphere, which seemed to be somewhere among the 90's, even in the densest shade of the tall evergreens. Very few of the party cared about ascending to the third story of this building, hence we crossed along its front to the green-houses of Mr. Cassidy. Here, outside, everything was suffering from drought, as there has been much less rain throughout this section than there has been in most other parts of the State. The grass-plats were suffering, and the want of water has delayed the growth of the herbage after being shaved with the lawn mowers. The green-houses were perfect pictures of bloom, order, and neatness. Here also additions are needed for the accommodation of both the gardening and botanical departments. We missed the presence of Professor Beal very much here. He had been called to Ann Arbor by the meeting of his college class, which had its first gathering for many year. After lingering for some time in this part of the grounds, President Abbot conducted us to the rockery, which is constructed on the bank of the ravine which here divides the grounds. Every spot seemed to be inhabited by some plant labelled with its botanical name. At the foot of the bank, which contained a flight of stone steps seemingly almost thrown together as if done by nature, there was an aquarium which was supplied with water by a small stream which flows from the drained lands above. Here were water plants in great variety, growing in and out of the water and in wet soils. On a miniature island in a pool were the two poisonous plants, the poison ivy and the poison sumac, *Rhus toxicodendron* and *Rhus venenata*, so placed that they could not easily be run against. Some small fishes were floating around the island, while the steps of the visitors startled a small white and brown chequered water-snake out of the bank and sent it swimming for shelter among the herbage which grew close by. All this, it will be noted, is a part of the living text-books of the institution in the botanical department.

Crossing the ravine we passed, at a respectful distance, the apiary of Professor Cook and heard the murmuring of the class, but we missed the chief very much, and felt inclined to exclaim: "Ah! where was Rodrick then? One blast upon his bugle horn were worth ten thousand" of these humming workers by way of illustration of this department. Passing through the strawberry grounds we noticed the long beds of the several kinds which were grown for their fruit, and also the multitude of varieties which are under trial as samples or as new sorts worthy of being tested. From thence the company were conducted to the chapel and the library, where, after waiting a short time to get cooled, we were called to dinner by the steward. Here we entered a large hall in the basement, where everything was as neat and clean as possible, and showed not a sign that about an hour and a half before the table had been set for 150 students.

Dinner being over, Professor Ingersoll took the party in charge and we passed over to the barns and the office of the farm department. In the barn the teams and some of the students were occupied in drawing in hay, and at the same time, for the purpose of illustrating how steam was used for the running of the machinery in the cutting and grinding of feed, the professor had set it at work, and the corn-sheller and grinder were busy grinding the mixed feed for the stock as it is used here. The steam engine is a small power situated about twenty rods east of the barn, under shelter of a small house by itself, just large enough for the engine and the fuel. From this runs a wire rope to the pulley and shafting in the barn, and this sets the whole or any part of the machinery at work, without the least danger from fire or from any accident of a dangerous nature occurring to the buildings.

Our next visit was to the cattle yard, where there were some good piles of manure, but we missed the great piles of compost which were the favorite works of Mr. Gulley, and which he regarded as a necessity for all that portion of the farm on the north side of the Cedar river, and all of which, except the river bottom, is sandy, and some of it a hungry gravel, the clay cropping out pretty strong on the knolls where the professors' houses are located. Here the first animal shown was a very handsome Ayrshire bull, which Mr. Webber (who is the oldest and most experienced grower of Ayrshires in Michigan) pronounced one of the best he had ever seen. His back is remarkably straight from end to end and strongly muscled. His ribs are those of the Ayrshire, not springing out like those of the Short-horn or Hereford, but full. His head was smooth, fine, broad between the eyes, and tapering to the muzzle. He was the best tempered Ayrshire bull we ever handled. His color was spotted red and white, the red prevailing. All seemed pleased with him. The Jersey bull was next led out and made a decidedly favorable impression. His color was a darkish brown, shading off on head and limbs into fawn color. His head is a picture, small, elegant as that of a stag or a race horse, a good, kindly eye, and a neat muzzle. He has a fine width across the shoulders, great depth of breast and fore flank, a good wide brisket, and a well muscled back. The flat sides of these two milking breeds give to each a paunchiness that to the breeder's eye is a defect, but it is a part of the natural make-up that would be considered a gross deformity in some other breeds. One particular point in this Jersey bull that was notable was his great length of body, set on short, fine legs, and his straightness of back, breadth of loin, and his well shaped hips. In the Ayrshire, the Jerseys, the Devons and the Herefords there sometimes crops out a form of rump which is expressively termed pumpkin-shaped. The quarter is not so square in its lines, but is rounded, so that it is also called "hog-rumped." In these Jersey and Ayrshire bulls both were free from this defect, though not heavy quartered in proportion to length of body. We think this description expresses the general opinion, as talked by men who are good judges of cattle, as well as our own.

The Jersey we regard as a perfect peacock, strong, vigorous, with the handsomest head, neck and shoulders we ever put an arm over, and his eye was a fine one, indicative of a good temper, for which the bulls of neither of these milking breeds are much noted.

Then came Rufus, the oldest Short-horn bull purchased at the New York Mills sales. He was in good fair condition, with rather less style about his appearance than any bull of that family of which he is a scion. Rufus is now six years old. He stands rather low on short legs, with a good depth of body, but his crops lack in fullness. His back and ribs are good, and so is his loin. His hind quarters are only moderately broad and deep, with his flank tucked up somewhat, his proportion is not good, and he lacks that straightness of line and squareness of body which is so desirable in the perfect highbred Short-horn bull. Following him came Custer, a two-year old purchased last year from the herd of Avery & Murphy. There was a good deal of difference of opinion about this young bull, which is just at a severe age for criticism. He is by the 23d Duke of Airdrie, and out of Georgiana Hillhurst by the Duke of Hillhurst. Custer stands up with a grand head and neck, set on good shoulders, with well sprung ribs and back straight and level. There is considerable fullness over the shoulders and a good front. He stands high, and the body is even and round, the lines on back and belly almost parallel. His loin is good and broad, but his defect is that of his sire, the 23d Duke—want of level hips and evenness of the back from the coupling to the point of the rump. He is not yet fully formed, but though he will grow to be a longer bodied animal than he now is, this point will not improve with age. When he reaches the age of three and a half, if he grows at all like his grandsire, the Duke of Hillhurst, he will appear longer in body than he does at present and be filled out still more when a year older and possibly be over 2,600 lbs. in weight. It is found that when he has been crossed on the heifers by Rufus that his calves are of good form, and one that was pointed out to us by Mr. Milton Gard was certainly a calf that would attract attention anywhere among Short-horn breeders.

While the cows and heifers were being driven up, the haying teams were pressed into service to take the party down across the bridge over the Cedar, and to that part of the farm devoted to crops. As we proceeded we came across a meadow on the right, where the classes in draining were laying down tile drains under the charge of Professor Carpenter. We had not time to go down there and see the work, for most of our party were due at the depot at half past five P. M.

In taking in the farm work and the rest of the stock, there was only time for a hasty glance. The general impression was that the fields in grass were promising a crop of hay of less weight than last year, on account of the season, which had been very dry.

In one field, a part of which was in potatoes, the crops looked even, clean, and thrifty. The other half of it had been just sown with rutabagas, forming the principal crop of roots. At the wheat field we paused a while, for here were sown in plats, upon trial, a large number of varieties, of which it was impossible to do more than look over the number and names. Then, as Mr. Ingersoll pointed out where the main field had itself been made experimental, large lands or divisions having been sown at several dates, with the design of learning something definite, if followed up year after year, relative to the effect of early and late sowing upon the winter wheat crop of this part of the State, we could only listen for a few moments to obtain the explanations necessary to understand what had been done.

Beyond seeing that crops were clean worked, and were growing fairly, there was nothing in this visit that was satisfactory to us as one somewhat acquainted with the plans of culture and the system on which they were carried out.

Coming back, the milch cows and heifers, and the breeding stock generally were looked over. All appeared healthy and in good condition. The Hereford cow that had been presented to the College had had two cross-breed heifers that looked quite as strong in color as she herself, though bred from a Short-horn bull. The muley black Galloways were there also, with some calves; and the Devons were well represented by some fine stock. The Ayrshires were also attractive to those who knew them as representatives of that breed, while the Jerseys are beginning to show that they, too, form a fair proportion of the stock at the Agricultural College.

At the close of this brief review, the whole party adjourned to meet at the chapel of the College, where the following proceedings were held:

President Webber called the meeting to order, and the roll of the executive members of the State Agricultural Society was called, and a quorum of 18 members were present.

The President called upon the President of the College.

President Abbot responded by expressing the pleasure it gave himself and the Faculty to receive the officers and Executive Board of the State Agricultural Society. When he read the inaugural address of the President last winter, declaring the two institutions should be brought intimately into relationship with each other, he was gratified at the good will which it had evinced to the College. He had always accepted with pleasure visits from the members of the State Agricultural Society, and he had always been in favor of measures therein recommended. He detailed the action of the Board of Agriculture, and said they were ready to meet them half way. This visit was such action as he hoped would be continued. The State Grange having expressed a wish last winter that its members should take an interest in an institution which was working in the same direction as that body itself, he had extended an invitation to them to meet the Executive Board of the State Society. Coming as they did from the farmers of the State, and representing them directly, he could not feel otherwise than gratified to welcome them here to-day. The State Agricultural Society, the State Grange, and the State Agricultural College were three separate and independent organizations which were designed to work toward a common aim, and that is the progress of both practical and scientific agriculture, and the elevation of the agricultural interests of the

State of Michigan. Why should they not work together? It was a mark of the progress which had already been made, and he so regarded it when he was enabled to welcome here these great and influential representatives of the interests which the College was founded to promote. He sincerely hoped that the arrangement would be continued from year to year.

Mr. J. J. Woodman called upon Mr. Luce, of Branch county, to respond on the part of the State Grange.

Mr. Luce said that he recognized the force and truth of all that President Abbot had alleged. He had long looked over the subjects to which he had referred. Michigan was an agricultural State in the strongest sense of the expression. It is but a few years since her lumber interests had been considered her main business, but we had seen her pine woods melt away and disappear, and the improving hand of agriculture supply their place with crops of more value. Agriculture must overshadow all other interests in Michigan. She had not the coal-fields of Pennsylvania, nor the water-power of New England, nor the climate of the cotton fields of the South, but in agricultural productions we could compete, acre for acre, with any State in the Union.

Mr. Parsons then offered the following resolutions, saying, in support of them, that he had rejoiced very much that this meeting had taken place, as it gave him an opportunity of observing the manifest growth and progress of the institution. He believed that the resolutions he had introduced would fully express the general views of all who were present as guests:

1. *Resolved*, That in the judgment of the Executive Committee of the State Agricultural Society, the aims, interests, and efforts of that organization and the State Agricultural College are identical in seeking to inspire a broad and intelligent ambition among our farmers, that more successful results in agriculture may be secured, and a higher tone in social and intellectual culture be attained.

2. *Resolved*, That it is, in our opinion, eminently wise, and we deem it for the best interests of both institutions and the State, that there be an annual visit by the Executive Committee of the State Agricultural Society to the College for personal observation and exchange of sentiment.

3. *Resolved*, That the Executive Committee of the State Agricultural Society have great pleasure in testifying to their high appreciation of the value of the efforts thus far made by the College in its instruction and management in promoting the interests of agriculture in all its departments; and we most heartily endorse the institution, and see in its future a most powerful influence for good to the State, fully compensating for all expenses incurred; and we most heartily commend it to the farmers of the State, as worthy their confidence and support.

4. *Resolved*. That we learn with unfeigned pleasure that more than fifty per cent of the graduates of the institution have become practical farmers, and we believe that the good influence of these men, scattered as they are throughout the State, will most favorably tell upon its future prosperity and renown.

Resolved, That the State Agricultural Society expresses a feeling of regret that the last legislature denied the College the appropriations asked for by the Board.

These resolutions having been read and amended, the Hon. J. W. Childs said he rose to respond on the part of the State Society, the State Grange, and the College Board, of all three of which organizations he was a member. The State Society, the State Grange, and the Agricultural College had met to counsel and advise as to how and in what manner the agriculture of the State could be most benefited. It was an interest on which the revenues of the State largely depended, and to promote more efficiency, and a greater increase in our resources in that direction was the duty not only of every farmer but of every citizen. As a member of the Board of Agriculture he was most heartily rejoiced to see this assemblage of so many distinguished for their devotion to the best interests of agriculture, and also capable of judging of the possibilities and capabilities of this institution. The College invites criticism and examination; it asks for the counsel and advice of the generous and sagacious body which took such prominent action in founding it; it needs their watchfulness and care to aid in building it up into a career of usefulness. He had given the subject much careful thought, and he had become intimately acquainted with its unremitting duties. Such a meeting of the representatives of these bodies to which the State looked in many ways for counsel and advice would have a beneficial effect in correcting erroneous impressions, and it was to be hoped that there would be from time to time, as the College grew in strength from year to year, power to instruct and facilities to extend practical and scientific education, more such meetings, where as advisers and counsellors all would combine as a powerful auxiliary to raise and keep in the front rank of such institutions all over the world, the Michigan Agricultural College.

Mr. Luce said that the State Grange necessarily, from its organization, meets with more farmers than any other institution known. Its representatives had come here by invitation of the State Board of Agriculture, and also in obedience to the expressed desire of the State Grange at its last annual meeting. The resolutions which had been read expressed in some degree the sentiments entertained by himself and the officers with whom he was associated. The College is unquestionably doing a great service to the State, and it was the opinion of the Grange that it should be enabled to do a great deal more.

Mr. Fralick said that he was well aware that the College and what it was doing must be popularized. The people of the State had not been kept fully posted as to the value of the germs which are here planted, and of their duty to aid in developing them. No, Mr. President, the minds of our people have not been sufficiently awakened to what this Agricultural College is doing for its growing sons, and what it is capable of doing for its daughters. Why, sir, one of the most distinguished visitors at the Centennial Exposition, while looking over the botanical collection sent from this institution, told me it was the best of the kind in the collection from all the States. That representation of this State came from this College, and was the work of the professor and his classes, as I understand. When the State Agricultural Society and the State Grange combine as they have done here to-day, to aid in bringing before the people the work which is going forward here from day to day, and its expansion from year to year, I have not a doubt but that the College will be popularized and that it will be estimated at its true value.

Mr. Parsons again arose and remarked that he hoped the next meeting would be still more satisfactory, but that he felt it his duty to direct attention to the fact that the opposition in the legislature to granting the aid which we had seen to-day was so necessary, came largely from the farmers themselves. The commercial and professional members knew too well the value of the institution to stint it in its growth, and when it had already expanded so that it has outgrown its facilities for imparting instruction to the students who flocked to it.

President Webber then called attention to the time, and put the question on the adoption of the resolutions, and they were unanimously passed.

Adjourned *sine die.*

THE TRANSACTIONS

OF THE

MICHIGAN WOOL GROWERS AND SHEEP BREEDERS' ASSOCIATION

FOR THE YEARS 1878, 1879 AND 1880, FROM ITS ORGANIZATION
TO THE CLOSE OF THE CONVENTION HELD AT
LANSING, FEBRUARY 10, 1880.

LETTER FROM THE SECRETARY.

DETROIT, *May 29, 1880.*

R. G. Baird, Esq., Secretary of the State Board of Agriculture of Michigan:

DEAR SIR,—I herewith transmit to you the proceedings and transactions of the Michigan State Wool Growers' and Sheep Breeders' Association, since its organization at Lansing, January 30, 1878, to the close of the Convention held at Lansing February 10, 1880. During this time the association has developed some strength, and promises to be a permanent organization which will prove a great aid in the development of all that department of Agriculture which includes the growing of wool, and the breeding of sheep, and one in which Michigan is most deeply interested as an industry that has grown as fast as her lands have become fit for cultivation.

With my most sincere respects, I am yours truly,

R. F. JOHNSTONE,

Secretary.

THE PROCEEDINGS OF THE WOOL GROWERS AND SHEEP BREEDERS' ASSOCIATION OF MICHIGAN.

CONVENTION FOR ORGANIZATION, HELD JANUARY 30, 1878, AT LANSING, MICHIGAN.

In accordance with a resolution adopted by a number of sheep-breeders at the State Fair at Jackson, on the 19th day of September last, a convention was held on Wednesday, the 30th of January, 1878, at Lansing, in the parlors of the Hudson House. The attendance was quite large and included most of the prominent sheep men in the State.

The following is a list of the delegates in attendance:

Shiawassee Co.—Benj. Hulick, E. Burlingame, Alonzo Barnes.
Calhoun Co.—C. A. Miller, Chas. E. Southwell, Wm. Redford, N. S. Anthony.
Oakland Co.—Lyman Cate.
Ingham Co.—Wm. A. Dryer, A. F. Wood.
Livingston Co.—Wm. Ball, E. I. Hardy, James Rumsey, G. N. Monroe, H. G. W. Fry.
Washtenaw Co.—A. A. Wood, F. C. Wood, P. S. Wood.
Macomb Co.—Adrien Taylor.
Jackson Co.—W. E. Kennedy.
Lapeer Co.—B. T. Ingalls.
Genesee Co.—D. P. Downey, T. R. Thompson, H. E. Dewey.
Ionia Co.—A. M. Willetts.
Eaton Co.—Stanley Freeman.

There were also present H. R. Losee, a prominent breeder from Darien, Genesee Co., N. Y., R. F. Johnstone of the Michigan Farmer, J. P. Thompson, Secretary of the Michigan State Agricultural Society, A. F. Wood of Mason, Superintendent of the Sheep Department of the State Society and President of the Ingham County Agricultural Society, R. E. Trowbridge of Bath, late President of the Michigan Agricultural Society, Ben. B. Baker, Secretary of the same, L. B. Potter and W. A. Dryer of Lansing, and others. The above gentlemen participated actively in the discussions, rendering valuable assistance by their suggestions and advice.

After waiting until the several trains had arrived from the east, west, north, and south the several representatives met in the parlors of the Hudson House and a temporary organization was effected by the appointment of the Hon. Wm. Ball of Hamburg, Livingston Co., as President and Schuyler Freeman, Esq., of Eaton Co. as Secretary.

On taking the chair the President made a short address, thanking the meeting for the honor conferred in placing him in the chair, and directing the attention of the convention to the objects of the meeting and to the interests which the members had met together for the purpose of devising measures to sustain.

On motion the following committees were appointed:

On Organization, and to draft Constitution and By-Laws—C. A. Miller, Calhoun county; D. P. Dewey, Genesee county; A. A. Wood, Washtenaw county; A. D. Taylor, Macomb county; E. Burlingame, Shiawassee county.

On Resolutions—A. M. Willetts, Ionia county; W. E. Kennedy, Jackson county; W. E. Dyer, Ingham county.

On Tariff—Benj. Hulick, Shiawassee county; Wm. Redford, Calhoun county; Lyman Cate, Oakland county.

The committee was instructed to draft resolutions expressive of the sense of the Convention on tariff, and to select persons in different parts of the State to circulate petitions to Congress embodying the same.

The Convention then adjourned for two hours to enable the committees to prepare their reports.

AFTERNOON SESSION.

The Convention was called to order by the President.

Mr. C. A. Miller, of the committee on Organization and to draft Constitution and By-Laws, submitted a report, which was accepted, and on motion the Constitution and By-Laws were considered section by section. As amended, they stand as follows:

CONSTITUTION AND BY-LAWS.

ARTICLE I. The name of this association shall be the Michigan State Sheep Breeders and Wool Growers' Association.

ART. II. The object and design of this association shall be to promote and advance all the interests connected with sheep breeding and wool growing; to procure just and wise legislation for the protection of wool growers; to confer with the manufacturers, and comply with their requests so far as the interests of the members will admit; to hold fairs, sheep-shearings, or festivals to promote competition and improvement; to protect and encourage sheep husbandry in all its bearings.

ART. III. The officers of this association shall consist of a President, Vice President, Secretary, Treasurer, and Executive Board of ten members, for the sole and entire management of its concerns, whose duty it shall be (having hereby full powers) to conduct the affairs and transact the business of said association as will best promote its interests. The ten members of the Executive Board shall be divided into two sections of five each, one of which sections shall be elected each alternate year to serve for two years, providing also, that at the first election one of these sections shall be elected for one year only. A majority of said board shall constitute a quorum for the transaction of business.

ART. IV. The officers of this association shall be elected annually; the time and place thereof shall be designated by the President and Secretary. The officers then elected shall enter upon the discharge of their duties at the close of the annual meeting, at which time the retiring officers shall respectively deliver to their successors the books, papers, money, and all property belonging to the association. In all cases where officers elected shall fail to qualify, or refuse to enter upon their duties, the old officers shall hold over until others are elected or shall be appointed by the board, whose duty it shall be to fill all vacancies that may occur.

BY-LAWS.

1. The President shall preside at the meetings of the Executive Board and of the Society; shall countersign all orders on the Treasurer, and shall perform such other duties as pertain to his office, or which may be imposed by the Executive Board to aid him in the discharge of his duties. In the absence of the President the Vice President shall preside.

2. The Secretary shall keep the records of the Association, and also a book of entries, in which shall be given a brief description of all animals entered for competition and exhibition at the fairs or shows of the Society, together with the names of the persons entering the same, with their postoffice addresses; shall attend to its correspondence; draw orders on the Treasurer for premiums awarded, or accounts credited by the Executive Board; make out the annual reports, and perform such other duties as pertain to his office, or may be imposed by the Executive Board.

3. The Treasurer shall keep an accurate account of all moneys which may come into his hands, pay them over to the order of the Secretary countersigned by the Presi-

dent; shall have the custody of all moneys, books, and property of the Association not properly in charge of other officers of the Society, and report at the annual meetings his receipts and disbursements in full by items; and he shall also keep a book of membership in which shall be transcribed the Constitution and by-laws, and in which all persons becoming members shall subscribe their names and postoffice addresses.

4. All persons residing in the State of Michigan may become members by the payment of one dollar annually.

5. At any regular meeting of the Society, the Constitution and by-laws may be amended by a two-thirds vote of the members present.

On motion of Mr. Thompson it was resolved to hold the first annual election on Wednesday evening, January 30th, 1878, and that no person should be allowed to vote who had not paid his annual dues to a temporary treasurer to be appointed by the Chair, and signed the Constitution and by-laws.

D. P. Dewey, of Grand Blanc, was appointed Treasurer *pro tem.*, and the Convention then adjourned till 7 P. M.

EVENING SESSION.

At 7 P. M. the Convention was called to order by the President.

Mr. Hulick, Chairman of the Committee on the Tariff, submitted the following preamble and resolutions as expressive of the opinions held by the wool-growers of Michigan upon the subject of the proposed change in the tariff on foreign wools and woolen manufactures:

WHEREAS, We are informed by the records of legislation in Congress that a radical change in the tariff on imports is about to be made at the present session, which will affect injuriously the interests of the wool-growers and the woolen manufacturers of the United States.

WHEREAS, The arrangement and distribution of the duties upon foreign wools and woolen manufactures were so wisely considered with reference to their adaptation to both interests in 1867, when the present tariff was adopted and placed on the Statute Book, that it has been found by the experience of the succeeding ten years it would be eminently improvident and a great financial blunder to disturb these duties at the present time, when the country is making every effort to retrieve its condition from the disasters and errors of the past.

WHEREAS, The beneficial operation of the present law has been made manifest, especially by the encouragement it has given to the vast expansion of the wool-growing and sheep-breeding interests of the whole country, whereby the production of wools adapted to the wants of the manufacturers has been carried from less than 100,000,000 lbs. in 1867 to 200,000,000 lbs. in 1878, and still there is not enough.

WHEREAS, The experience of California, of Texas, of Colorado, and other States and Territories during the past ten years, instructs us that the sheep-breeding and wool-growing interests are those which carry civilization and commerce into the unsettled region and vast territory west of the Mississippi, and hence promote and encourage immigration, increase the value of lands, create new outlets for trade, and enrich the Union by making productive lands not adapted to other departments of agricultural industry.

WHEREAS, It is evident to us by the experience and development of wool growing at home, as well as by the history of the enormous expansion of wool growing in the colonies of Great Britain, in Australia, and in Southern Africa, that to promote wool growing and woolen manufacturing conjointly is eminently wise and patriotic, as well as financially correct. Therefore

Resolved, That the wool growers of the State of Michigan, in convention assembled, do hereby respectfully recommend that in all matters concerning the duties to be imposed upon wools and woolens coming from foreign countries there shall be no change at present from the existing law, for the reason that the statute now prevailing in both interests is perfectly harmonious and requires neither alteration or amendment in the statutes relating thereto.

Resolved, That it is manifest by the increase of production during the past ten years, by the development which wool growing has given to the new States and Territories, and by the encouragement and attraction it has given to immigration, that the existing tariff on wools and woolens has been eminently beneficial to the whole country, in all its length and breadth, and hence no change can be safely made at this time.

Resolved, That an examination of the history of the wool manufactures of the United States shows that the disastrous periods have been the result of the non-existence of satisfactory laws in relation to the introduction of wools and woolens from foreign countries, by which they have been allowed the enjoyment of our unequaled markets without restriction, and have thus embarrassed and weakened our own home manufactures, rendered capital employed by them unremunerative, and diminished the working field of the operatives; hence it is evident a change reducing the tariff on wools would create another of those periods to be avoided by all sagacious and honest statesmen, as well as by the whole country.

Resolved, That we not only believe, but know, by the results of the present law in relation to wools and woolens, that the best interests of the country, financially and commercially, will be promoted to the greatest possible extent by allowing the law as at present on the statute book to remain unchanged and unaltered.

Resolved, That our Senators and Representatives be and hereby are requested to lay the foregoing preamble and resolutions before both Houses, and especially before the Committee of Ways and Means of the House of Representatives.

The reading of the resolutions was listened to with undivided attention and interest, and they were adopted with the entire concurrence of the meeting.

On motion the members of the convention proceeded to the election of officers for the year 1878, and to hold office till the next annual meeting, five of the executive board being chosen for one year, and five for the regular term of two years.

LIST OF OFFICERS.

President—William Ball, Hamburg.
Vice President—C. A. Miller, Marengo.
Secretary—R. F. Johnstone, Detroit.
Treasurer—D. P. Dewey, Grand Blanc.
Members of Executive Committee for two years—I. S. Wood, Saline; W. E. Kennedy, Liberty; J. T. Rich, Elba; C. E. Southwell, Marengo; E. Burlingame, Byron.
Members of the Executive Committee for one year—A. D. Taylor, Armada; J. N. Smith, Bath; W. A. Dryer, Lansing; L. Cate, Highland; A. M. Willetts, Muir.

STANDING COMMITTEES.

On Finance—I. S. Wood, W. E. Kennedy, J. T. Rich.
On Rules—The President, Secretary and Treasurer.

The President, upon his election to office, made an appropriate address, remarking upon the growing importance and magnitude of the sheep interest in Michigan.

The committee on resolutions reported as follows:

WHEREAS, The American Merino sheep being a legitimate outgrowth of the Spanish Merino, with pedigree tracing back prior to the importations of 1814, therefore resolved,

1st, That we do adopt the cognomen of American Merino as including none but those of pure Spanish origin.

2d, That this Association establish a sheep register as soon as possible.

3d, That this Association recommend that the State Agricultural Society be requested to offer premiums on three classes of fine wool sheep: first, on American Merinos bred for weight and quality of fleece; second, for Delaine Merinos bred for length of staple; third, on Merina grade ewes; also a sweepstakes premium on such rams in American Merino class, three years old and over, with not less than five of his get. We also recommend that the Executive Committee of the Association be permitted to suggest names for the viewing committee on the same.

4th, That the Society discard the practice of sheep-washing.

5th, We would suggest discussion of the proper time for sheep shearing.

STATE REGISTER.

The subject of a State Register was quite fully discussed, and it was urged that such a register was as important for sheep as for cattle and horses, and that the sooner the practice of registering was commenced the better it would be for breeders and all parties concerned.

A. M. Willett, chairman of the committee, reported a resolution that the association establish a State Sheep Register. A number of gentlemen urged the propriety of such a course.

The resolution was adopted and the following committee was appointed to report a plan of registration at a future meeting: N. S. Anthony, Marengo, Jessup Wood, Saline, and John Thompson, Grand Blanc.

The preamble and first resolution were then presented for discussion.

Mr. Southwell moved that the word "Thoroughbred" should be prefixed to "American Merino."—Lost.

Mr. J. S. Wood claimed that the term "American Merino" was the proper one as representing the American improvement made upon the Spanish Merino, to which the generality of the members assented.

Mr. Miller moved that the following amendment be added after the words "pure Spanish origin:" "with pedigree tracing back to the importations prior to 1814."

This amendment was supported, and immediately aroused a spirited discussion. Many of the speakers claimed that if a standard was contemplated it might as well be established at the present time, and that it was essential that a good one should be decided upon.

On the other hand, it was urged that the proposed standard would exclude the great mass of the sheep in the State, and some of the members of the society stated that such a resolution, if carried, would exclude their sheep from registration and from the class.

Mr. Anthony declared that if his flock was cut off by the amendment he was willing to obtain sheep that would be admissible in the class, and announced his determination to do so.

This opinion and feeling appeared to govern the majority of the convention, and the amendment and the resolution, as amended, were adopted.

The resolution, as amended, reads as follows:

Resolved, That we adopt the name "American Merino," as including all and none but those of pure Spanish origin, with pedigree tracing to the importations prior to 1814.

PREMIUMS AT STATE FAIR.

The committee reported the following resolution with regard to premiums at the State Fair:

Resolved, That this Association recommend that the State Agricultural Society offer premiums on three classes of fine wooled sheep.

1. On American Merinos, bred for profit and for quality of fleeces.
2. For Delaine Merinos, bred for length of staple.
3. On Merino grade ewes.

Also a sweepstake premium on stock ram, three years old and over, with not less than five of his get.

Mr. Ben B. Baker offered the following resolution relating to the same subject.

Resolved, That the State Agricultural Society be requested to offer premiums for the following classes, viz.:

1. American Merinos.
2. Delaine Merinos.
3. Southdowns.
4. Shropshires and other middle wools.
5. Leicesters.
6. Cotswold and other long wools.

And in each class premiums be offered for ram three years old and over, with five of his get.

Mr. Hardy submitted the following resolution:

Resolved, That this society recommend that the State Agricultural Society offer premiums on three classes of fine wool sheep.

1. On American Merinos bred for weight of fleece.
2. For Delaine Merinos bred for length of staple.
3. On Merino Grade.

Also a sweepstake premium on American Merino stock ram, three years old or over, with not less than five of his get, open to the world. We also recommend that the executive committee of this association be permitted to make a suitable premium list, and to suggest names for viewing committee on the same.

In the discussion which ensued Mr. Baker urged the point that the convention appeared to be too much governed by the fine-wool interest, and made a plea in favor of granting premiums to long and middle wool sheep.

Mr. A. F. Wood, Superintendent of the Sheep Department of the State Fair, who was present at this point of the proceedings, announced that the premiums of the State Agricultural Society for the fair of 1878 were already fixed and could not be reconsidered.

This announcement caused not a little surprise and some amusement, and the result was that all the resolutions relating to premiums were referred to next year's committee on that subject.

JUDGES AT THE STATE FAIR.

The committee recommended that the executive committee of the association be permitted to suggest names for the viewing committee on sheep at the State Fair.

Mr. A. F. Wood stated that the appointment of viewing committees on sheep at the State Fair was in his hands, and he would be glad to receive suggestions from members of the association in relation thereto.

The subject was referred to the executive committee.

The Secretary was instructed to send the resolutions on the tariff to each member of Congress from the State, both in the House and the Senate.

The first meeting of the executive committee of the society was announced to be held the last Tuesday in February, at the Hudson House, Lansing, at 10 A. M.

The secretary was instructed to procure the necessary books in which to keep the records of the society.

The business of the meeting having been completed, the convention adjourned.

List of members who took part in the above proceedings and signed the Constitution:

Wm. Ball, Hamburg; H. R. Dewey, Grand Blanc; C. E. Southwell, Marshall; Wm. Radford, Marshall; J. N. Smith, Bath; E. W. Hardy, Oceola; F. C. Wood, Saline; L. W. Barnes, Byron; James Rumsey, Oceola; Lyman Cate, Highland, Oakland county; N. S. Anthony, Meringo, Calhoun county; A. M. Willett, Muir, Ionia county; J. S. Wood, Saline; A. A. Wood, Saline; H. G. W. Fry, Howell; W. E. Kennedy, Liberty, Jackson county; E. Burlingame, Byron, Shiawassee county; D. P. Dewey, Grand Blanc; J. P. Thompson, Detroit; A. D. Taylor, Romeo; B. N. Ingalls, Almont; S. E. Jeffries, Okemos, Ingham county; J. H. Thompson, Grand Blanc; C. A. Miller, Marshall; Benj. Hulick, Byron; R. F. Johnstone, Detroit; Ben. B. Baker, Detroit; G. M. Colby, Shaftsburg; W. A. Dryer, Lansing.

PROCEEDINGS OF THE FIRST ANNUAL CONVENTION,

HELD AT MARSHALL, CALHOUN COUNTY, DEC. 18, 1878.

In pursuance of the call made by the President and Secretary in compliance with the by-laws of the Michigan State Sheep Breeders and Wool Growers' Association, the members convened at Marshall, on Wednesday, Dec. 18, 1878, and held the first annual meeting at Grange Hall, at 3 P. M.

The President, Wm. Ball, Esq., of Hamburg, Livingston county, called the meeting to order, and announced that the meeting would first attend to the business of the Society, and then that the general programme as published would be in order.

The Secretary of the Society, R. F. Johnstone, of Detroit, then read the proceedings of the last meeting, detailing the organization, the Constitution and by-laws of the Society, as minuted in the record, which were approved.

The Treasurer, D. P. Dewey, of Grand Blanc, made his report, which is as follows:

Treasurer in account with Michigan State Sheep Breeders and Wool Growers' Association:

To cash received for membership certificates of 1878	$29 00
By account to Detroit Tribune, and for postage	9 00
Balance on hand	$20 00

All of which is respectfully submitted.

D. P. DEWEY, *Treasurer.*

GRAND BLANC, Dec. 17, 1878.

The report was referred to the Finance Committee.

The President then stated that the annual meeting had been called for the purpose of giving the Association the opportunity of making such recommendations to the Executive Committee of the State Agricultural Society in regard to the premium list on sheep at the annual exhibition of 1879, as might be advisable for calling out the greatest numbers of the choicest sheep of the State in competition, and in recommending such rules as would secure the fair and just award of premiums under the examination of committees. He esteemed it his duty to lay this subject before the convention at the earliest moment so that it might have due consideration.

On motion a committee on order of business was appointed, consisting of J. N. Smith, of Bath, chairman; B. G. Buel, of Little Prairie Ronde, and E. W. Hardy, of Oceola.

The Convention then adjourned till 7 o'clock P. M.

EVENING SESSION.

7 o'clock P. M.

The Convention met, the President in the chair, who made the following address:

One of life's greatest problems is how to successfully meet the requirements of life Physically speaking, how to furnish good food and suitable clothing.

Mankind in all ages has endeavored to deal with this question, and the various ways in which it has presented itself and has been met have largely depended on the intelligence and enterprise of the world's inhabitants. Ages since, when man pursued a roving life, or resided in hamlets, the sheep was considered necessary, not only as an article of food and raiment, but as a commercial commodity. "Abel was a keeper of sheep," and from time immemorial the sheep has been considered an emblem of innocence and purity. Many are the illustrations drawn by sacred and profane writers showing with what respect and love sheep have been regarded. There is no animal, domestic or otherwise, so great a friend to man, great in its two-fold relation of furnishing food and raiment, and the reward of the possessor is proportioned to its treatment. It is also a friend to the farm by its enmity to many of the pests of the field, which it destroys, and a certain number of sheep may be kept on every farm without interfering with other stock. It is a fact, patent, that while nearly all other industries are paralyzed, sheep, whether for mutton, wool, or stock purposes, are yielding a fair profit on the investment. These facts are awakening a deeper interest in sheep raising, and from Maine to Texas men are looking into this matter as never before.

The millions of uncultivated acres in the great west afford abundant nutritious food for sheep, and to-day thousands of them are being transported to those fertile plains, and to the more eastern portion of our domain buyers must look for a supply to meet the requirements of this new country. It therefore becomes a matter of the greatest moment to every sheep breeder in Michigan to be prepared to meet this demand, whether it be for the Merino, the long or middle wool, or the high grades. Thus time and expense may be saved, and Michigan be the gainer, both in finances and reputation.

There is, perhaps, no animal which, to breed successfully, requires so much thought and study as the sheep. Fitted by nature for a double purpose, it is more difficult to produce what is desirable and within its capacity than in any other animal. While in raising cattle there are many points in regard to form, size, and general adaptation which the breeder must bear in mind, similar care must be used in sheep-breeding, with the additional responsibility of producing an acceptable covering of the body, in the way of fleece, which is a most difficult task, for here combination of quality are necessary to constitute a fleece which will be of sufficient thickness, length, and weight to be profitable to the breeder, and at the same time have the greatest commercial value. This is a problem which few breeders have solved, which is emphatically true as to the Merino, and I think it also true in producing good specimens of form and fleece in the other classes of sheep. The greatest difficulty lies in obtaining that which is desirable in form, size, and fleece. If we try to breed for a long fleece, it is frequently secured by the sacrifice of a heavy one, and *vice versa*.

The peculiar relation existing between the body, so far as shape is concerned, and the fleece, is well known to the breeder; but it requires great skill to combine them to the best advantage; hence the need of close attention and a general knowledge of the physiological laws governing.

It is a fact, admitted by all, that men by combining together can accomplish that which it is impossible for the individual to perform, and this, perhaps, is one of the obstacles to successful farming, and also to a greater degree of proficiency in stock-raising. The isolation of men in the same line of business, each following his own plan, regardless of any fixed law or theory, is never productive of the best results.

Another hindrance to the more general improvement in sheep-breeding is the idea that because A, in a neighborhood, has some sheep and is making sales that B has no chance of succeeding in the same business. This is a mistake, for competition is the surest source of success. As one good act stimulates exertion, so does the production of one good animal stimulate the desire to produce a better one. If an entire neighborhood should invest in sheep for breeding purposes a much greater interest would be felt in the enterprise, and as a large proportion of success in improvement is due to the male, there is no doubt but much better stock rams would be used than if only one person was engaged in the enterprise. The great success of breeders of merino sheep in Vermont and New York, the breeders of long or middle wools in England, or the shorthorn breeders in Kentucky, is due largely to the fact that where so many are engaged in the same pursuit they have access to the best stock. Men do not always purchase stock on first examination; usually a comparison is made between flocks and prices of different individuals. The purchaser always seeks that locality where this can be accomplished at the least expense. It is also true that he will have a better lot from which to select.

Every thoughtful breeder in Michigan feels the loss of the separation of flocks. The few flocks of thoroughbreds in this State are scattered over so large an area of territory that any man searching for a car load of rams or ewes for the western market goes direct to Vermont or New York, where he can economize time by quickly procuring what he desires. This matter is worthy attention. The money thus expended abroad should be kept at home. Every owner of a flock of thoroughbreds should stimulate his neighbor to invest in his line of business, and assist by selling at as low a figure as possible, thus increasing the number of flocks and thus removing one of the obstacles to purchasers.

Feeling and experiencing the difficulties alluded to, a respectable number of sheep breeders and wool growers met at Lansing about ten months since and drew up articles of association, elected regular officers, and made a preliminary start in the work of a sheep breeders and wool growers' association, and to-night we meet to review the year's work and to give more definite shape and character to the organization.

At the time of our organization last winter the doctors and lawyers (who understand the wants of the farmer better than he does himself) then in Washington as the representatives of the people, headed by Mr. Wood, of New York city, tried to revise our tariff laws for the benefit of the farmer and wool grower by obliging him to sell his wool at from five to ten cents less per pound than he is now doing. But, thanks to that national organization known as the grange, and similar organizations of our own, which said "Stop this proceeding," I believe it was stopped; and by what I learn from the honorable gentlemen who are again convened, they are going to let it stop. My belief, founded on observation, is that the most persuasive argument to one of these gentlemen is the probability, possibility or certainty of losing his political head by pursuing a course which his constituents do not think tends to their best interests. Even our milk-and-water President, in his message, devotes a few chapters to agriculture, stimulated, no doubt, by the stand lately taken by the farmers through their various associations to express their desires; but on the subject of stock-raising he is silent, as on any other branch of agricultural industry, supposing that the words of Washington, in his eighth annual message, would be sufficient for all practical purposes. Our lawyer Governor, too, is made happy in being recognized by the grangers, and has promised to aid in all needed legislation for the farmers. The power of the husbandman is felt through their organizations, and, aside from the great benefit to our business as breeders, it will be in the future of incalculable benefit politically. Thus it becomes necessary for us to use every means to sustain them. The success of the farmer is the foundation of all business successes, and as the raising of good stock increases, in a like manner does good farming follow.

It has been thought by some that the premiums offered by the State Agricultural Society on sheep were not proportioned, relatively, to those of other stock, and that the classification in all respects was not what was desired. I have made a hasty comparison of the amount of premiums offered last year for cattle, horses, and sheep, excluding breeders' special premiums on horses. Premiums offered on cattle, $2,419; on horses, $2,036; sheep, $834. Sheep as compared with cattle, about one-third; as compared with horses, about two-fifths.

Perhaps a well considered plan of classification of sheep, as well as a schedule of premiums to be presented to the Executive Committee of the State Agricultural Society at its meeting to revise the premium list for 1879, might be expedient.

By the rules of the National Wool Growers' Association, this association becomes auxiliary, and has through its President and two delegates selected by this association a voice in its general management.

Fellow farmers, stock breeders, and wool growers, it seems to me that Nature has done much for the State of Michigan. No State has a better climate. No other State in the Union has so great and varied sources of wealth. The almost continuous water navigation around her borders affords carrying facilities enjoyed by few States. The numerous railroads crossing her domain, all connect with the great lines running east and west, while others penetrating her most northern borders afford facilities for carrying to the great commercial centers the varied productions of those portions of the State. She has more and better pine timber than any other State. Her iron and copper mines are inexhaustible; her coal beds are yielding their valuable products, while her beds of gypsum provide immense amounts of fertilizers for all parts of the State. As to variety and richness of soil, no State exceeds her. It is well adapted to all classes of sheep, added to which are her unrivaled institutions of learning. With all these advantages, what prevents Michigan from taking the front rank as a sheep and wool producing State? Then let us awake to our own interests; let us remove every obstacle to success in this enterprise, and let us show by practical results what can be accomplished by a strict adherence to nature's laws. The sheep interest in this State is as yet in its infancy.

In conclusion, let me urge upon the members of this association the necessity for persistent, intelligent action, and great good will result. A sun from which shall emanate a steady light shall arise, and the time will not be far distant when we can say with pride that Michigan is a star of the first magnitude in the sheep galaxy.

Mr. J. N. Smith, from the Committee on Order of Business, then read the following report:

After the President's address, there shall be appointed the following committees: 1. On Resolutions. 2. On Finance. 3. On Premium List for consideration by State Agricultural Society. 4. On Sheep Shearing and State Sheep Show. 5. On Registry of Thoroughbred Sheep.

Discussions are to be limited to ten-minute speeches. After the reading of papers and essays, there shall be fifteen minutes allowed for questions and remarks on each, unless general consent be given to extend the time.

It is hereby recommended that the following-named gentlemen be placed on the programme: E. Townsend of Pavilion Center, N. Y., on Breeding Ewes; D. Hubbard of Marshall, on Black-faced Sheep; A. F. Wood of Mason, on the adaptation of long-wooled sheep to the mixed husbandry of Michigan.

The report was adopted.

The question being asked as to the relations of this organization with the National Wool-growers' Association, Mr. Townsend explained that there were no binding obligations between the two. The National Association had spent considerable money fighting the bill relative to duty on wool, and had made assessments upon the State associations for that purpose. Vermont had paid its assessment of $100, but Michigan had not responded for a like amount because the assessment was made before the State association was organized. The question was discussed briefly, but no action was taken.

The secretary then read the following letter from W. G. Markham of Avon, N. Y., on the Registration of Sheep and its Uses:

AVON, N. Y., *December 16, 1878.*

C. A. Miller, Esq., Vice President Michigan State Sheep Breeders' Association:

MY DEAR SIR,—I very much regret my inability to be present at your annual meeting to be held at Marshall, Dec. 18th, to participate in the deliberations of your association, and particularly to discuss the registration of sheep, as you requested. As I can't be with you I will write some thoughts that occur to me in connection with your discussions. The value of such gatherings by our sheep and wool men cannot be overestimated. Improved sheep-husbandry is a science, far deeper than is generally regarded. Among our domestic animals no other has so great a number of fine points as the Merino sheep. They have not only the essential qualifications of constitution, form, and style which are characteristic of horses and cattle, but have also their covering into which enter an almost endless variety of wools as regards both quality and length of staple. I sometime since wrote to Mr. Geo. Wm. Bond, of Boston, regarding the classification of sheep at our fairs. Mr. Bond is well known as one of the most eminent experts in the country in matters of wool fiber. In his reply he says:

"Not only is there the great variety of merino wools as to fineness, length, yolk, etc., to which you refer, but also a difference even to be found in the wools of any two places, owing to the climate, feed, etc.; differences so subtle as to be hard to define, but sufficient often to make a wool utterly unfit for the manufacture of goods of certain descriptions, though it may bear so close a resemblance in appearance to that which is used as to make one unfamiliar with the manufacture consider it a mere whim that a distinction should be made between them."

Again, referring to our classification, Class 2, bred for fineness of fleece-quality adapted to the manufacture of broadcloths and similar fabrics, he says:

"I am sorry to say that to this day no such wool has been grown in this country, as no section has been found adapted to its growth. I mean wool suitable for broadcloth. Much beautiful wool has been found adapted for fancy cassimere, flannels, and even doeskins, but none that will give a finished face to compare with those raised in Germany, South America, Cape of Good Hope and some parts of Australia. This class, however, leaving out the adaptation referred to, is of the greatest importance."

I refer to Mr. Bond to show the fine points to be looked after in fleece alone.

No other of our domestic animals are so plastic or are so readily moulded by the breeders as the sheep, but the laws which govern their modification are most intricate and mysterious. It is very clear that success in breeding our improved Merinos requires a high degree of intelligence and an earnest devotion to the business.

It is evident to all who are familiar with the first principles of breeding, that it is of first importance in making selections of rams for coupling with ewes, to know not only their pedigrees but the characteristics of each of their several ancestors as far back as possible. The Flock Record, adopted by one New York Sheep Breeders' Association, is a most simple and convenient book for keeping such record, showing at a glance the pedigree and full description of each sheep, with weight of fleece, etc., together with the origin of the flock. To keep such a record of a flock of 150 sheep would probably require three days' time in the year. It is safe to say that the breeder who thinks this too much trouble will find himself distanced by his competitors who keep the record.

The value of registration of the pedigrees of our thoroughbred American Merinos in a convenient form for reference, is apparent. To be most valuable it should be free from sectional aggrandizement, and be universally patronized by breeders of such sheep throughout the United States. Delay has been made in forwarding pedigrees to the American Merino Register in hopes that a union might be effected between it and the Vermont Register upon a basis that would be unanimously adopted, but efforts in that direction have failed, and pedigrees are being forwarded to the American Merino Register with the expectation of bringing it to a successful completion in due time.

The annual meeting of the New York Sheep Breeders' Association will probably be held the last Wednesday in January next, at Rochester, at which time we should be glad to see yourself and others of your association.

Very truly yours,

WM. G. MARKHAM.

Mr. J. N. Smith inquired what necessity there was for having more than one Merino register for the United States.

Mr. Townsend said there was no necessity for more than one, but several had been started through local jealousy or other causes. The Vermont Register is nearly completed and will soon be published. The New York Register is not as far advanced. The Ohio Register is not satisfactory. Mr. Townsend thought they would all have to be consolidated into one national registry.

The question was asked why Michigan could not have a sheep registry of its own.

R. F. Johnstone replied that the work of providing and keeping up a respectable record would not pay, either by the fees that would be collected or by the sale of the work when printed and published. Such a work would require an enormous amount of time from any person who was adapted by education and training for such a work. The sheep breeders of Ohio had got out one very valuable volume, and it was of great value to the breeders of that State. It cost $3 for the single volume, but it had proved so unremunerative that the work had been given up. There was now in preparation in Vermont a register that promised to be of great value to the breeders throughout the United States, and which would contain all that was valuable to the breeders of thoroughbreds. What was needed at present was not so much the pedigree of individual rams as the proof that the blood of flocks kept for the supply of thoroughbreds was perfect and without flaw in their descent from imported Merinos. The Vermont Register promised to do this work more thoroughly than any other publication of the kind that had yet been attempted. So far as we can learn, it is in the hands of experts, and it is not probable that the management will haggle about a word in the name. It should, in reality, be a national work, and the adoption of a general name will only be a question of time. Many of the breeders of this State, as well as of Western New York, had already registered their flocks in it, and coming from the source from whence all our western thoroughbreds have sprung, it was well adapted to the wants of our Michigan breeders, and though its name might seem sectional and limited, it would in reality be a national work, and must be so from its very nature. If we get what our breeders need, we might exclaim with the great dramatist, "What's in a name?"

Mr. D. P. Dewey, of Grand Blanc, was in favor of Michigan breeders meeting with the Vermont Registry, on condition that the name be changed to the National Register.

By request, Mr. Peter Martin, of Rush, N. Y., explained briefly the character of the American Merino Register proposed to be issued by the New York breeders. He preferred the plan to that of Vermont, or any other, and invited the coöperation of Michigan and other States. Still, he would be willing to unite with Vermont, if the name of the register were changed so as to be national.

After some further discussion, the subject was referred to the committee having that subject in charge, with instructions to report the next day.

APPOINTMENT OF COMMITTEES.

The following committees were then appointed:

Resolutions—R. F. Johnstone, J. N. Smith, D. P. Dewey.
Finance—W. J. G. Dean, R. B. Caruss, B. T. Ingalls.
State Fair Premium List—A. F. Wood, Hugh McDonald, William Ball, W. E. Kennedy, D. Hubbard, R. B. Caruss.
On Sheep Shearing Show—R. M. D. Edwards, D. P. Dewey, R. Dougherty.
On Registry—J. W. Thompson, M. L. Ray, E. W. Hardy.

Mr. C. A. Miller was then called upon for his paper on "Practice in Sheep Husbandry," which he read, after which the meeting adjourned until the next morning.

After a careful glance over the subject of practical sheep husbandry, it seems to me as if nothing new could be added to its history. Sheep husbandry is connected intimately with the early history of man. What records we have are mingled with romance and allegory, The sheep and the owners are placed in climes fanned by soft zephyrs, in lands where the scenery is enchanting, where shady nooks under umbrageous trees are cooled by purling brooks that meander through luscious pastures dotted with flocks feeding and luxuriating on the sweet herbage, while lambkins sport around them to the music made by the singing rivulets. Add to this beautiful scene the silver-haired shepherds watching the constellations as they pass through the heavens by night, or resting by day, while the youthful shepherds and shepherdesses are engaged in their duties with the flocks and rehearsing to each other the old, old story that has tingled in the ears of man and woman since the fall from Eden.

Then again we read of monarchs, and their princes and nobles using their despotic and feudal powers to promote the production of wool by the protection of the flocks of their vassals, making stringent edicts, not permitting the feet of the wayfarer to tread on the sheep walks, and appointing regular corps of shepherds to care for the flocks, and to lead them from the plains of Estremadura to the mountain slopes of the Sierras of Castile and Arragon, and as the rigors of winter descended on the mountains, to bring them back to the milder climates and more productive pastures of the valleys and the plains.

The Electors of the German States eagerly seized on the sheep of Spain, and poured out their treasures to propagate them. The king of France accepted the sheep of the Escurial flocks as a royal gift from his brother on the throne of Spain. England herself, through King George the Third, made her diplomacy serviceable in procuring the best flocks of the merino, though Spain had her laws prohibiting the exportation of her sheep. This infringement of the law, tacitly submitted to, led to other infringements, of which our own ancestors at last took advantage, and the true merino was at last imported into the United States in the early part of the present century.

It was about the early part of the eighteenth century that we began to learn something of the inner workings of sheep husbandry, and that romance and poetical conceptions were brushed away by the hand of reality. It was then that the wants of mankind swept away the privileges heretofore enjoyed by the nobles and landowners and the edicts of monarchy were as idle wind against the march of progress. Then it was that plebeian energy accomplished what neither emperor nor kings had been able to command with all their untold wealth. One of these plebeians was Bakewell of England. The wonderful results which he worked out in the Leicester sheep gave him the credit of being in possession of some secret by which he would change the embryo lamb into any form he desired, and that he rather encouraged the promulgation of that idea. Time and experiment in other directions have proved that his secret was but the results of an intelligent and busy brain, backed by untiring industry and perseverance. Ellman was another worker of the same character, but in a different direction. He unfolded the capacities of the Down sheep of England to furnish a supply of the choicest animal food known to the world, and size, character and form of the whole race of the middle-wooled sheep of Great Britain were improved, so that they now seem to be almost a different variety from their ancestors that cropped the short herbage of the bleak tracts of pasture in Sussex, Hampshire, Shropshire and Oxfordshire.

During the early part of the present century our own citizens, while hard at work in the formation of the Republic of the Union, and trying to supply the demands which its numerous wants had created, took the merinos from the hands of the importers, and, placing them on the hills of New England, found that it was necessary to modify and change the characteristics which had been acquired by centuries of the treatment accorded them in their old habitat—Spain. Hence we find in tracing the history of practical sheep husbandry in this country, that a few men commenced the work of improvement and of developing the nature of the merino sheep with a marked success that has made their names famous throughout the length and breadth of the land.

The early importations, we have reason to believe, possessed the long, small head and thin neck, the narrow chest, the flat rib, the long legs, the small bone, the light fine fleece, which is to-day condemned, and has been changed into the full head and neck, the broad chest, the round rib and back, the short legs, the larger bone, and the heavy fleeces, which to-day characterize the best flocks of the hardy, robust, compact, and symmetrical sheep which meets the eye in so many flocks of the American merino, and charms it with its beauty and perfection, as models of highly wrought mechanical skill.

The results obtained from these improvements on the original importations have been as satisfactory, financially, as they have been in meeting the wants of the breeder in his demands for a higher development. They have not been gained without study or without earnest and untiring labor and many disappointing experiments. To be a successful breeder, requires peculiar gifts as well as talents of no mean order. The same powers of reasoning and observation, those great instincts which flash like lightning on the inventor, the enterprising merchant, the great leader of armies, and that power of discrimination and selection which is cultivated by experience, are brought into play by the men who revolutionize a herd of animals. The Bates and the Booths are just as great in their way as farmers and breeders as are the Bismarcks, the Lincolns, or the Grants, who lead in the progress of a nation. The idea that men who are fools in any other occupation, can make good enough farmers, should be exploded. We want Bakewells and Ellmans—more Atwoods and Ham. monds—more Riches and Robinsons. We want more farmers with foresight and energy who will study the necessity of their flocks and herds, and who will breed only from the best of ther kind, no matter where they come from. It is only the careless, the idle, the farmer without brains that will be heard to remark that practical sheep husbandry of the highest order will not pay.

THURSDAY MORNING SESSION.

The Convention met, the President in the chair.

The President invited all who were present to take part in the discussion who took an interest in the breeding of sheep and their improvement.

Mr. Thompson, from the Committee on Registry, reported that two of the old committee were absent, and the President appointed Mr. Ray and Mr. Hardy to fill out.

Mr. Peter Martin, of Rush, N. H., read his paper on "Stock-raising."

Mr. E. Townsend followed with "Remarks on the Adaptation and Management of Breeding Ewes."

Mr. Hugh McDonald, of Horton, read a paper on the "Long wooled sheep and their management."

Mr. Deville Hubbard, of Marshall, followed with an address on the "Profits of keeping the long wools as a business in place of all others."

Mr. Smith, from the Committee on Order of Business, reported, and recommended that the election of officers shall be the first business of the afternoon session; also that a session of the Convention be held in the evening, commencing at 7 o'clock. Adopted.

Mr. J. D. Adams, of Climax, remarked that while we were providing for the growth of wool, he would like to know what we were going to do with it, and he would ask if it would not be well if some time was given to a consideration of establishing the prices at which it must be sold to make it profitable.

The Convention then adjourned.

THURSDAY AFTERNOON SESSION.

The Convention met, the President in the Chair.

The first business in order was the election of officers, and it was ordered that the following members shall be declared elected by a *viva voce* vote:

President—William Ball, Hamburg, Livingston county.
Vice President—C. A. Miller, Marshall, Calhoun county.
Secretary—R. F. Johnstone, Detroit.
Treasurer—D. P. Dewey, Grand Blanc, Genesee county.
Executive Committee—Hugh McDonald, Horton, Jackson county; Richard Dougherty, Parkville, St. Joseph county; J. J. Jones, Hillsdale, Hillsdale county; Deville Hubbard, Marshall, Calhoun county.

The members continuing for the year 1879 are:

J. S. Wood, Saline, Washtenaw county; W. E. Kennedy, Liberty, Jackson county; J. T. Rich, Elba, Lapeer county; E. E. Southwell, Marengo, Calhoun county; E. Burlingame, Byron, Shiawassee county.

Mr. A. F. Wood was then called upon to read his paper "On Long-Wooled Sheep and their Management."

Mr. D. P. Dewey, of Grand Blanc, followed with an "Essay on Sheep Show and Fatting them for Exhibition."

The subject of washing sheep was discussed, and it was the almost unanimous conclusion that the practice of washing sheep should be discontinued, and the following resolutions were adopted:

Resolved, That it is the expression of this Convention that the operation of washing sheep before shearing is one that can be profitably dispensed with, and that sheep if properly cared for so that their fleeces are kept free from all extraneous matter will do better, and the wool will be in better condition for the buyer and seller if unwashed.

Resolved, That taking into consideration the risk to the sheep, and the great expense and labor which washing sheep incurs, that we do not consider that washing the heavy-wooled Merinos is profitable to the wool grower, and that in should be discarded generally.

Mr. C. A. Miller presented letters which he had received from J. L. Hayes in relation to the so-called Wood tariff and its propositions, which were read.

The Secretary presented a letter of G. B. Stebbins, Esq., who had acted as representative of this association at Washington during the discussion of the proposed change in wool and woolen sections of the Wood tariff bill.

The communications were referred to the Committee on Resolutions.

The convention then adjourned to meet at 7 o'clock P. M.

THURSDAY EVENING SESSION.

The convention met, with the President in the chair.

The Committee on Finance reported that they had examined the report of the Treasurer and had found that his receipts to the close of the year had been $29, out of which he had paid $9, and that a balance remained on hand of $20. Adopted.

The Committee on the Premium List reported that they would recommend that in making any suggestions to the State Agricultural Society at its annual meeting that such suggestions include a recommendation of an increase in the aggregate of premiums offered for sheep, which is now about $800 to $1,200, and also the adoption of the following resolution:

Resolved, That this convention respectfully recommends to the State Agricultural Society that the sum of $1,200 be appropriated for the division of the premium list upon sheep, in accordance with the recommendations of the committee on that subject.

Adopted.

The same committee recommended the adoption of the following resolution:

Resolved, That the class of thoroughbred American Merino sheep shall consist only of sheep registered, or which shall have a certificate of eligibility to registration in such register as may be selected by the State Agricultural Society as its standard, and that another class shall be known as "full blood" Merinos, which shall consist of Merino sheep not eligible to registry as thoroughbreds.

Adopted.

The same committee recommended the adoption of the following resolution:

Resolved, That it is recommended to the State Agricultural Society to offer a sweepstakes premium of not less than $25 for the best thoroughbred American Merino ram exhibited at the next State Fair.

Adopted.

The same committee reported the following resolution:

Resolved, That it is the sense of this convention that sheep intended for exhibition at the State Fair should be shorn not later than the 20th of April preceding the exhibition.

Adopted.

The Committee on Registration submitted two reports, one of them recommending that the Vermont registry should be adopted. The other that if the American New York register be completed that it should be adopted. The latter report was adopted.

Mr. Wood, from the Committee on Premiums, reported in favor of holding a sheep-shearing show and festival in the city of Jackson during the third or fourth week in April, 1879, and that the Executive Committee be authorized to present the subject to the State Agricultural Society, representing that sheep should be shown in the spring, and that in this connection they should be solicited to contribute $500 towards the expenses of such exhibition, and that in case sufficient aid cannot be procured in that direction, that the Committee are authorized to apply to the Michigan Central Association for the facilities to hold such exhibition on their grounds at Lansing. Also that the Executive Committee of this Association are directed to prepare a premium list and make all necessary arrangements for the sheep show and festival hereby proposed to be held.

The report was accepted and adopted.

Mr. S. P. Wormley, of Marshall, was invited to give his experience with the long wools and their profitable management, on which he took issue with Mr. D. Hubbard.

The Committee on Resolutions submitted the following report:

The Committee on Resolutions report the following as expressive of the views of this Convention on the several subjects submitted to it:

WHEREAS, This meeting is the first convention called since the meeting at which this Association was organized, and there has been brought before it a number of subjects of great interest to the sheep-breeding and wool-growing interests of the State of Michigan; therefore it is

Resolved, That it is the general opinion in regard to the establishment of a Register of American Merino Sheep, so far as information has been laid before the convention, that there should be established a Merino Sheep Register which should be sustained by the breeders of this State as well as by the breeders of all other States in which the growing of fine wools is a prominent industry, and that such Register should be known as the National Register of American Merino Thoroughbred Sheep, and to such work we shall accord our most cordial support.

Resolved, That we do hereby recommend that no change should be made in the tariff of duties on wool, and that our Senators and Representatives in Congress be notified of the action of this Convention.

Resolved, That the thanks of this Association are hereby tendered to J. L. Hayes, Esq., of Boston, for his active and able advocacy of the interests of the woolgrowers during the last session of Congress, and also to G. B. Stebbins, Esq., of Detroit, for his representation of the views adopted by this Association at its meeting at Lansing on the 30th of January, 1878.

Resolved, That it is with pleasure we recognize the presence of E. E. Townsend, of Pavilion Center, and of Peter Martin, Esq. of Rush, New York, as visitors in response to the invitation tendered to them, and that we most heartily appreciate the counsel, advice and experience which they have given in answer to the many questions presented on sheep-breeding.

Resolved, That it is our earnest desire that the Michigan State Agricultural Society should co-operate with this Society in holding a sheep-shearing exhibition of short-wools and long-wools during the spring of 1879.

Resolved, That the general attendance at this the first Annual Meeting of the Michigan State Breeders' Association, the manifest interest taken in its proceedings, and subjects which have been discussed, have proved that this organization is destined to promote the improvement and value of the sheep of the State.

Resolved, That we commend to the attention of the members of this Association that each in his own neighborhood solicit the addition of members to the Association, and thus strengthen it in influence and in finances by increased membership.

The resolutions were adopted.

The Secretary, Mr. Johnstone, just before the close of the Convention, made a brief address on the general history and condition of the sheep interests.

The Convention then adjourned *sine die*.

PROCEEDINGS OF THE SECOND ANNUAL CONVENTION,

HELD AT LANSING, FEBRUARY 10th, 1880.

The second annual convention of the Sheep Breeders and Wool Growers' Association met in pursuance of a call, at the Hudson House, Lansing, commencing on Tuesday evening, February 10th. The authorities having tendered the Association the use of the Pomological Society's room in the State Capitol, it was accepted and the members adjourned thither. On calling the roll the following members presented themselves and paid $1 each:

Calhoun county—C. A. Miller and C. E. Southwell, Marshall; W. S. Sprague, Duck Lake; R. J. Emery, Albion; Wm. Radford, Marshall; J. W. Sprague, Battle Creek.

Jackson county—S. S. Brewster, Hanover; M. L. Dey, Springport; L. F. Knowles, Parma; W. J. G. Dean, Hanover; Frank Elmer, Devereaux; Wm. N. Adams, Jackson; O. V. Hammond, Milton Gillett, and Myron Gillett, Springport; J. W. Newberry, Hanover; R. D. M. Edwards, Napoleon; J. W. Dey, Devereaux.

Livingston county—Wm. Ball, Hamburg; E. W. Hardy, Oceola; W. J. Garlock Howell.

Oakland county—Adam Diehl, Milford; Lyman Cate and J. F. Bamber, Highland.

Washtenaw county—F. S. Finley, Ypsilanti; C. M. Fellows, Manchester; J. E. Smith Ypsilanti; J. S. Wood and A. A. Wood, Saline.

Macomb county—A. D. Taylor, Romeo.

Cass county—B. G. Buel, Little Prairie Ronde.

Shiawassee county—Martin Dietrich, Laingsburg; L. W. Barnes, Byron; W. G. Morrice, Morrice.

Lenawee county—Henry Wilson, Tipton.

Kalamazoo county—R. Bishop, Vicksburg; S. B. Hammond, Kalamazoo; J. M. Neasmith, Vicksburg.

Ingham county—A. F. Wood, Mason; W. H. Horton, Eden.

St. Joseph county—A. W. Maring, Mendon; E. Olney, Leonidas; Richard Dougherty, Parkville; Geo. Pellett, Mendon.

Hillsdale county—J. M. Southworth, Allen; W. E. Kennedy, Somerset.

Van Buren county—John Gillespie, Lawton; E. B. Welch, Paw Paw.

Lapeer county—John Abbott, Lapeer; Geo. W. Higby, Lapeer; C. S. Dean, Lapeer; J. T. Rich, Lapeer; B. T. Ingalls, Almont.

The President being in the chair called the meeting to order and delivered the following address:

ADDRESS OF THE PRESIDENT.

Gentlemen of the Wool-growers and Sheep-breeders' Association:

More than another year has passed since our last meeting. Many changes have taken place since that time. In the eastern world, want, famine, pestilence, war and terror reign; with us are peace and quietness, plenty to eat and much to spare. While in our own country, with her varied industries, with her great mineral wealth, her thriving manufactories, her diversified agricultural pursuits and great variety of climate, and with her republican form of government, prosperity is everywhere apparent; in the old world adversity, depression, and an unusual disquiet and distrust pervades the masses.

Russia, with her iron heel and despotism placed on the galled neck of her subjects, is hardly able to hold control, and is contemplating another war, hoping to direct attention from the slumbering volcano which threatens to destroy her cruel and rotten dynasty.

Prussia, with her serious church question and jealous neighbors, the disaffection of her population is hardly able to preserve a surface quiet. England, with her Afghan and Zulu wars, her land difficulties, and starving subjects, her great crop failures, her large increasing public debt, the general depression of her business interests, coupled with the almost universal Irish discontent, has a heavy burden to carry, and must ere long make many needed reforms in her modes of government, and curtail that grasping and avaricious policy which characterizes the Beaconsfield rule.

While such, in brief, is the position of affairs in some of the important governments in Europe, in the United States prosperity and happiness everywhere abound. Resumption of specie payments is an assured fact. A greenback dollar is equivalent to a gold dollar, and one can go from Maine to Mexico's farthest shore, Nova Scotia to Behring's Straits, through her "Majesty's Dominions," and all are glad to get the once despised greenback at its par value.

Our mining interests, so long depressed, are now paying dividends on stock, mines are being worked to their full capacity, and all departments, from the smelting works to the rolling mills and manufactories, are obliged to run night and day to supply the increasing demands for their products.

Railroads are being built to a large extent, dividends on stock are reported, and a healthy activity pervades every department in that direction. Agricultural interests are in a prosperous condition. Money heretofore withheld from a lack of confidence in business enterprise is now seeking investment. Rates of interest are materially reduced, and in every department of industry there are unusual signs of activity. Farm products are in better demand, at an increased value, Wheat, pork, beef, mutton and wool are returning a fair profit to the producer. Though in all departments of farming there are positive gains, there is no one interest that shows so great an advance, and is so sure to pay well for years to come as wool raising. No other interest in agriculture has made so great a stride in its upward career, and no other has any better basis for substantiability. With the dawn of better times came an increased demand for woolen goods, and with the demand better prices. This demand has exceeded the most sanguine expectations of every one. To supply this demand manufacturers are all running to their fullest capacity, and cannot supply the wants of the trade. As a sequence the price of wool has advanced over fifty per cent within the last few months, and the advance will undoubtedly be sustained. With these paying prices for wool, farmers will improve the shearing capacity of their flocks by better care and more careful breeding. More and better wool and better animals will be the result. At no time in the history of sheep breeding has there been so great a demand for thoroughbred males as the present. It is not confined to any particular locality, but from all over the sheep producing regions.

The demands of the far west are very great, and must be supplied from the more eastern portion of the United States. Every good lamb that is dropped should, if possiple, be raised. But, says the timid man, this demand cannot last. Too much wool, too many sheep, and the result will be starvation prices again. This is what he is always saying about all branches of business, and he never helps any. The lessons of the past should be heeded. Sheep in the days gone by ruled high. Wool was high, and many invested their money recklessly and lost. The fault was not in the business, in the times and in the men. The war caused a large demand for woolen goods, and consequently an increased demand for wool. Greenbacks were worth about forty cents on the dollar, but passed for a dollar. Everybody had plenty and expected to have, and extravagance ruled the masses, the rich, the government official, and the laborer alike. Wild investments were made, debts contracted, and everything seemed prosperous, the war suddenly collapsed.

A very large amount of manufactured goods were thrown upon the market by the United States Government, as well as by manufacturers and merchants, whose shelves were overloaded with goods made from wools bought at the prevailing high prices. The country was full of foreign wools and woolen goods brought over by the importers. The demand ceased. Greenbacks depreciated greatly in value, debts contracted in the wild times of seeming prosperity had to be paid with the depreciated currency, and then came, as must always come under similar circumstances, a general and universal shrinkage in values and consequently a paralysis in business all over the land, and in sackcloth and ashes have we been paying penance for years, as a result of the most cruel and relentless civil war on record. But circumstances have changed. Peace encircles our domain. From the debris and desolation of those terrible years, Phœnix-like, business prosperity has arisen from these ashes and sends its cheering influence into every department of industry, and to-day a man who carefully invests his means and time in sheep husbandry does so with the certainty of a liberal reward for his investment. It is estimated that about eighty per cent of the wool manufactured of late has been produced in this country, the other twenty per cent having been imported from other countries. With the increased consumption of woolen goods and the certainty of its continuance, it needs no very astute calculation to show that an over production of wool is not to be feared in the near future. This country is receiving from the old world its hundreds of thousands of her people who must all be consumers, for all must be clothed.

Mutton is so desirable and necessary an article of consumption, and brings so remunerative a price, that sheep will not accumulate as fast as in years gone by. By a concert of action and unity of interests, the wool growers and manufacturers, through associations kindred to ours, have formed a powerful co-working national organization. The views of the wool grower and manufacturer no longer conflict, but work in harmony. The present tariff on wools and woolen goods works satisfactorily to both producer and manufacturer, and if let alone by Congressional tinkers will give stability and security to our business as wool growers.

By these two national organizations, sustained by the different State organizations, we represent no feeble power, and can by united affort be of material aid in checking a revision of that portion of our present tariff laws.

By organization much more can be accomplished than by individual effort. Among the many societies of merit in this State ours holds no mean place. Its importance demands our earnest attention. To sustain it by well attended meetings, by papers well prepared relative to its interests, accompanied by discussions and interchanges of views on different subjects, is our duty. It should not only be a Michigan Wool-growers and Sheep-breeders' Association in name, but in fact. Its importance should bring breeders from every part of the State. The acquaintances formed will alone pay for the time and expense. It should be confined to no particular class of breeders. Not Merino, Longwool, Downs, nor any special breed should be represented, but all breeds. Every breeder should feel equally at home and champion his particular choice of breeds. The great principles of improvement in breeding, underlie all breeds, and each breeder should make such application of them as best pertains to his chosen breed or family.

The pecuniary consideration in raising wool and mutton is of the greatest importance, and each should have the benefit of the other's experience. Annual meetings of our society should at least be held, and as many more as those interested think best. At this meeting a programme of exercises should be arranged for the next, and persons be chosen to prepare such papers as the programme calls for, and I would recommend that a committee of three or more be selected to perform such duty. of exercises by two or three officers is a difficult task to perform satisfactorily. If This selecting a time and place of holding our meeting and arranging a programme necessary, I would recommend that the rules be so amended that the time and place of holding the next meeting be fixed now. I think some expression in the form of a resolution should be discussed and prepared at this meeting relative to washing sheep before shearing. The manner in which samples of wool should be arranged for exhibition at our fairs ought to be stated, so that there may be a similarity in the arrangements made by the different exhibitors. This is a matter of importance and deserves attention. The election of your officers should be by ballot, as every voter has a better chance to express his choice of candidates than by a *viva voce* vote. Some steps should be taken to have a report of our meetings and deliberations published in the stock journals of the country.

Gentlemen of this Association, I heartily thank you for the honor you have bestowed on me in twice electing me your president. I have endeavored to discharge my duties as I understood them. I thank you for your generous support and good will.

This address was followed by a paper from E. W. Hardy, of Oceola, Livingston county, on the keeping of breeding ewes, from which we condense the following:

One of the most practical and important subjects that could come before a meeting such as this one, is the care and management of breeding ewes. Commencing with the summer months, the ewes at this time are suckling lambs, and they should be kept in small flocks, perhaps from 30 to 50 in a flock, with plenty of range and good pasture including a variety of grasses.

Would not favor a too rank growth as the stability of the grass is lessened.

On a pasture for sheep, should avoid sowing plaster as much as possible.

Particularly at this time of the year water is indispensable for young and old; also salt is very essential. One should see his flock often. Was not in favor of housing through the summer. It is detrimental to the ewe. They are more liable to the disease.

Wean the lambs the latter part of August, or the first of September, putting the ewes on short feed to stop the flow of milk, also milking them occasionally. Out of a flock of 150 have never been troubled with sore or broken bags.

We keep the ewes in moderate flesh until breeding time, as they are surer of breeding than when too fleshy.

At breeding time the ewes should be thriving and gaining. Give a little grain if necessary.

Tagging is very essential, both spring and fall. Keep record of breeding and time of lambing.

Stock rams should suit the flock. Get the ram which will make the greatest improvement, and not let $5 or $20 on the price of a good ram overbalance your better judgment. More breeders have made decided blunders in the use of inferior stock animals, because they could save a few dollars, than there ever has been through ignorance. Breed only to superior sizes. It is better that a ewe be not bred at all than to a ram inferior to herself. Michigan breeders are making mistakes in this.

Ewes should be kept in a flock by themselves according to age and strength. Ewes should have plenty of exercise. They should be driven 80 rods and fed straw and cornstalks. For grain, I prefer oats and bran, or barley, oats and bran. Do not like corn; it should be mixed with other grain, and grain should be fed twice a day.

As the lambing season approaches ewes should be carefully handled—should have a feeding of roots daily; the sugar beet is preferable. One man should have charge of the sheep; a regular system of feeding should be adopted.

As ewes commence lambing they should be kept out of storms and in a warm place, and require much attention and care. A good crop of lambs pays well, and such a crop shows good management.

The following resolutions were offered by Mr. J. P. Thompson, of Detroit, and adopted:

Resolved, That so much of the President's address as refers to the tariff on wool be referred to a committee of three, to be entitled the committee on tariff.

Resolved, That so much as refers to a harmony of views between the wool grower and the manufacturer be referred to the same committee.

Resolved, That so much as refers to the importance of this association, be referred to a committee of three, to report programme for next meeting; also to the several other matters presented by the President in his address, and included in the first resolutions.

The President announced the following committees:

Tariff—The Hon. John T. Rich, chairman; C. A. Miller, J. S. Wood.
Programme—D. P. Dewey, C. M. Fellows, A. F. Wood.
Rules—R. D. Edwards, W. E. Kennedy, John H. Thompson.

On motion of Lyman Cate, Lansing was agreed upon as the place for holding the next annual meeting.

REPORT ON REGISTRY.

Mr. C. A. Miller presented the following report:

To the Honorable Association of Sheep Breeders and Wool Growers:

Your committee that was appointed at the last annual meeting held at Marshall, to confer with other associations in relation to forming a union to prepare a plan for publishing a National Merino Register, would report as follows: We have attended a meeting of the New York State Breeders' Association, found them ready to act. They passed a resolution and appointed a committee to meet with Michigan and other States that will join in perfecting a plan for publishing a National Merino Register. We have corresponded with the Secretary of the Illinois Sheep Breeders' Association; they called their meeting at an early day and appointed three delegates to confer upon a plan for register. They appear to be alive and determined to go ahead. We have corresponded with the Secretary of the Wisconsin Association, and we see by a published account of their doings in the Inter-Ocean that they have appointed a committee to meet with others in forming a union to agree upon some feasible plan to organize a National Merino Register.

A crude plan has been drawn out by the above correspondence something like the following: Each State to appoint a committee to examine all pedigrees of residents of their respective States, each to make its own rules and regulations, to pay the expense incurred of making examinations of pedigrees, and preparing the same for publication; the pedigrees to be submitted to a committee appointed by the several States, and when passed upon by them it shall be final. This committee to have charge of and publish the work, every State bearing its share of the expense.

Your committee would recommend that, if you should deem it best to pursue this subject farther, the Association amend and add to its constitution and by-laws so much as is necessary to accomplish the end in view, such as appointing a State committee on pedigrees with a system of rules and regulations to govern them, that this important work may be commenced; also to appoint a committee to meet with the several committees that have been appointed by other associations. It has been suggested that they will meet you at Jackson in this State.

All of which is respectfully submitted.

C. A. MILLER.
D. P. DEWEY.
R. F. JOHNSTONE.

This report led to an animated and useful discussion, and on motion of Mr. Rich was laid upon the table with a view to further consideration. At 10 o'clock P. M. the convention adjourned till Wednesday morning at 8 o'clock.

Wednesday, February 11.

The Convention met in the capitol at 8 o'clock in the morning, the President in the chair.

The Secretary presented his annual report, which was as follows:

The Secretary submits the following report for the past year of the business of the Michigan State Sheep Breeders and Wool Growers' Association:

Received from 35 members at the meeting held at Marshall, Dec. 19, 1878		$35 00
In Treasurer's hands at that date		21 00
		$56 00
Checks were paid at the meeting at Marshall as follows:		
No. 1, for stamps to D. P. Dewey	$1 00	
No. 2, for account of books of record, printing, stationery, etc., audited	35 73	
		36 73
		$19 27

This financial statement shows that the treasury is in a perfectly healthy condition, while it indicates that the first annual meeting was an improvement on the meeting that was held for its organization.

The Secretary asks leave to direct attention of the Association to the very important progress which has been made in the business of breeding sheep, and especially the Merinos. In the Longwools and other breeds of English descent we revert naturally to the improved stock which are bred or are the produce of the improved native sheep of that country. But the improvement of the fine wools has created a type of sheep that is exclusively American. We cannot go outside of it to make any improvement. That is the result of development in this country. That development has been so productive of good results that it has been found necessary that breeders should know how and in what direction their efforts should be directed. This consideration brought out amongst the breeders of horses the production of the stud books. In cattle it established the necessity of the herd books. In these Merino sheep it is this necessity which has inaugurated the Vermont Register, and it now seems to call for the extension of that admirable work into a national register, or the establishment of a register that will be national. How and in what manner it shall be done as far as Michigan interests are concerned, it is a part of the work of this association to decide.

But sheep breeding has received a still greater impetus from the immense consumptive demand for wool which has been developing during the year 1879. On January 1 of that year the financial policy of the government was settled by unexpected but complete success of the resumption of specie payments. That success, with the low rates of interest on the national bonds, set free an immense amount of capital to seek investment in new enterprises, and in no direction did it work with more energy than amongst the woolen manufacturers. The consumption of wool has created a demand that has advanced prices all over the world, and we see the clip of this year bringing double the prices paid last year.

Meanwhile the effect has been to set the sheep breeders at work to supply the demand for choice sheep that will continue the improvement in size and qualities in fleece which has marked the progress in breeding originated by the Richs, the Atwoods, the Hammonds, and other distinguished breeders of the past generation, and this Association is, as I believe, met for that purpose.

There were present at this session, the distinguished breeders L. P. Clark, Vermont, E. E. Townsend, of New York, and Mr. Edwards, of Montana. Mr. Edwards made an address descriptive of the husbandry of Montana and its advantages for sheep-breeding. He had been formerly a resident of Michigan. He said the finest grasses for pastures grew there and were more lasting throughout the season than in the wilderness farther southward. The water was of the finest quality, and timber was found quite abundant. The Missouri river secures it from railroad monopolies. With these natural advantages it has another which cannot be too much esteemed, and that is, it has a climate quite free from malarial diseases. Its territories are splendid for stock feeding, and a large supply of live stock is now sent to Chicago. We may look there for the development of sheep growing by natural growth to an extent that will rival California, and the production of wool will be superior to any now grown. Even now the advantages of position are so great that wool can be transported from Montana and laid down in Boston for one and a half cents per pound. In fact it would pay the wool growers of Michigan to ship their wool to Montana and then start it east by the Missouri river route to supply the Boston markets.

At the conclusion of Mr. Edwards' address, the president announced the election of officers for the ensuing year as in order, as by the resolution adopted yesterday. The Convention then elected the following officers for the ensuing year, Mr. Lyman Cate and H. R. Dewey being appointed tellers:

President—Jessup S. Wood, of Saline.
Vice President—A. F. Wood, of Mason.
Secretary—W. J. G. Dean, of Hanover.
Treasurer—D. P. Dewey, of Grand Blanc.
Executive Committee for two years—B. F. Buell, B. T. Ingalls, Wm. Ball, R. D. W. Edwards, A. W. Maring. For one year—Hugh McDonald, Richard Dougherty, J. J. Jones, Deville Hubbard.

President Wood returned thanks for his election in a few well considered words. He considered the interest they represented as second in importance to none in the State.

R. D. Edwards, of Napoleon, offered the following resolution:

Resolved, That a committee] be appointed by the chair to revise the constitution and by-laws.

Adopted.

The chair appointed as such committee R. D. Edwards, W. E. Kennedy and John Thompson.

Mr. Dean, of Hanover, moved a reconsideration of the vote to fix the annual meeting on the third Tuesday of December in each year. Carried.

Mr. Dean then moved that the resolution be referred to the committee to revise the constitution and by-laws. Carried.

Mr. Dewey then read his paper on the National Register and the Breeding of Thoroughbred Merino Sheep.

Mr. Garlock, of Howell, read an essay on the "Breeding of Long Wool Sheep."

Mr. H. R. Dewey moved that all accounts against the Society be presented this afternoon, and if not presented that they be declared forfeited.

The Secretary begged leave to state that the resolution was useless and hoped it would be withdrawn, first, because there were no accounts to present; secondly, it would be inoperative as a fiat against the payment of legal dues. During the past two years the officers had not only served gratuitously, but such things as postage and other matters as advertising and traveling expenses had been done for the good of the Society, and no accounts made of them.

The resolution was then withdrawn.

Mr. Dougherty moved that the report of Mr. C. A. Miller be taken from the table for discussion. Amended so as to provide that it be taken up at the afternoon session.

Mr. Edwards discussed the subject on its merits. He was in favor of a national register. The breeders of Michigan had already paid the Vermont breeders amply, and he did not propose that we should any longer be in a state of pupilage. We are now of age and ready to act for ourselves.

Mr. Dougherty explained that we had a large number of long wool breeders as a part of the members of this association. The subject was of no interest to them. If there was a national register established it would not be of any value to them. He thought if the fine wool members wanted a registry established for Michigan that they could not be called upon to support it. He believed that the only way we could proceed in this matter was to have a separate association formed for the care of such subject, and let those who were benefited by it support it.

It was decided that the report be taken from the table and considered this afternoon.

Mr. Rich, from the committee to consider the subject of the tariff, reported the following resolutions:

Resolved, by the Michigan Sheep Breeders' and Wool Growers' Association, That our Senators and Representatives in Congress are requested to use all honorable means to prevent any change in the present tariff on wools. [Applause.]

Resolved, That the President, Secretary, and Treasurer of the Association have power to appoint one or more delegates to meet with any meeting of manufacturers or committee of the same, whenever in their opinion the interests of the Association will be subserved thereby.

The Secretary of State sent the following sheep and wool statistics to the convention:

Sheep six months old and over in Michigan in the year 1879, and the number of sheep and pounds of wool sheared in the year 1878:

STATE AND COUNTIES.	May, 1879. Number.	SHEARED IN 1878.	
		Number.	Wool, lbs.
State	1,772,312	1,670,790	8,666,467
Alcona	46	38	194
Allegan	35,030	31,933	140,770
Alpena	53	42	172
Antrim	613	393	2,298
Barry	40,861	36.223	174,254
Bay	728	573	2,816
Benzie	107	75	435
Berrien	25,070	22,909	98,367
Branch	51,985	48,029	219,046
Calhoun	86,854	83,931	438,349
Cass	28,852	26,693	126,969
Charlevoix	156	108	625
Cheboygan	169	181	713
Chippewa	112	76	380
Clare	38	63	323
Clinton	57,004	52,799	267,236
Delta	42	34	158
Eaton	53,723	48,656	236,778
Emmet	45	20	80
Genesee	78,067	74,808	401,993
Grand Traverse	1,222	820	4,954
Gratiot	14,092	12,398	56,929
Hillsdale	79,483	72,496	385,314
Houghton	5	------	------
Huron	5,444	4,346	20,844
Ingham	59.268	56,350	283,578
Ionia	79,468	75,672	378,365
Iosco	81	24	132
Isabella	2,860	2.400	11,705
Jackson	95,541	93,679	509,188
Kalamazoo	67,448	61,286	306,955

COUNTIES.	May, 1879. Number.	SHEARED IN 1878.	
		Number.	Wool, lbs.
Kalkaska	81	85	514
Kent	50,323	49,910	237,058
Lake	387	205	1,050
Lapeer	46,090	41,912	233,608
Leelanaw	1,010	912	4,817
Lenawee	88,891	89,949	480,584
Livingston	95,740	95,223	535,647
Macomb	59,177	56,225	298,616
Manistee	277	188	968
Manitou	289	492	1,279
Marquette	102	32	206
Mason	133	96	633
Mecosta	2,539	1,980	9,973
Midland	850	734	3,965
Missaukee	19	8	80
Monroe	27,254	25,977	115,372
Montcalm	11,331	10,986	54.221
Muskegon	1,975	1,705	8,183
Newaygo	4,255	3,583	17,175
Oakland	121,728	117,536	643,980
Oceana	2,386	1,311	7,924
Ontonagon	198	130	598
Osceola	1,514	1,058	5,572
Ottawa	12,988	11,892	49,811
Presque Isle	10	12	50
Saginaw	8,963	7,817	37,041
Sanilac	9,870	8,749	42,445
Shiawassee	51,900	47,602	250,870
St. Clair	29,576	26,540	120,004
St. Joseph	36,887	33,165	165,955
Tuscola	16,557	13,775	70,092
Van Buren	35,273	31,350	160,043
Washtenaw	164,524	156,909	910,591
Wayne	22,019	22,984	116,606
Wexford	26	22	164
Unknown townships	2,703	2,651	10,752

On motion the committee adjourned till the afternoon at 2 o'clock.

AFTERNOON SESSION.

The committee met, with the President in the chair.

On motion of Mr. Miller the resolution calling for his report was taken from the table.

Mr. Miller then moved that it be laid on the table. During the recess a movement had been made looking to the establishment of an independent society of Merino breeders which would provide for the business as to a sheep registry. The motion was adopted.

R. B. Caruss read a paper on the profits of sheep husbandry and the preparation of wool for market.

Mr. A. F. Mason followed with a paper on the question of "What Sheep Shall we Breed?"

Mr. J. N. Smith, of Bath, discussed the merits of the long wool. He felt confident that the changes incident to a new country bring about changes in the live stock just as much as to bring in the changes in customs and habits. He felt satisfied that the raising of lambs for market was a profitable part of the business which had not been pursued to any extent in this State, and which could not be pursued profitably with the Merino, but which was one of the requirements of the breeding of the long wools. To raise lambs for market he was satisfied that there was a good deal of money in the business, but the trouble arises from the fact that there is not enough of them raised in one locality to furnish car loads to the drovers. They were wanted in car-load lots or they could not be disposed of. To be a legitimate breeder of thoroughbred stock was something we can't all be. For that business men need capital, fixtures, general capacity and experience, which were out of the reach of an ordinary farmer who has his farm in his own hands. The long wools are scattered over the State in only a few hands, and hence arises the difficulty in obtaining car lots, and also in procuring the best blood with which to maintain the quality of their flocks. The ordinary farmer has not the time or skill nor the judgment requisite to furnish the well improved animals which are necessary to develop the flock and keep up its early growth. He considered the history of the Merino sheep developed the fact that a great change had been worked in them during the past forty years. He was able now to raise a very palatable Merino mutton, and this was formerly impossible to find. He has had a large experience with the Southdowns, and was of opinion that they could be made profitable if there were enough of them bred in one place to furnish car-loads. He could not furnish them in such quantities, and therefore had to depend on the local markets. His opinion was that the long wools and middle wools should be bred in large numbers in particular localities and counties adapted for them.

Mr. C. M. Fellows, of Manchester, read a brief history of the Merino sheep.

Mr. R. D. M. Edwards, from the committee on the constitution and by-laws, made the following report, which was accepted and adopted:

Your committee to which was referred the subject of a revision of the constitution and by-laws, beg leave to report that they have had the same under consideration, and do hereby recommend for your consideration the following amendments and additions:

1st. Amend article three to read as follows: The officers of this association shall consist of a President, a Vice President, a Secretary, and a Treasurer, who shall each be elected by ballot at 10 o'clock A. M. of the second day of the annual convention, and who shall hold their offices respectively until their successors are elected and have signified their acceptance of the office. There shall be an Executive Board, consisting of ten members, who shall hold their offices for two years, shall be elected each year at the annual meeting, which board with the officers of the association shall conduct all its affairs, and transact all business for said association; and they shall have power to fill all vacancies which may occur.

2d. Amend article four so as to read as follows: "The annual meeting of the association shall be held on the second Monday of December, at 7 o'clock P. M."

3d. Add to article five: "The place of holding the annual meeting shall be decided by the association at each annual meeting."

4th. Amend the first by-law by omitting all after the word "duties" in that paragraph.

R. D. M. EDWARDS,
J. H. THOMPSON,
W. E. KENNEDY.

Mr. Caruss moved that the constitution and by-laws of this association be printed in the Michigan Farmer, Detroit Post and Tribune, and Free Press.

Mr. Caruss moved that the subject of washing sheep previous to shearing be taken up and discussed.

Mr. Lyman Cate offered the following resolution as expressive of the views of this association on this subject:

Resolved, That the Michigan State Sheep Breeders and Wool Growers' Association do hereby recommend that all washing of sheep previous to shearing be and is hereby discouraged, and the influence of its members shall be exerted to promote the sale of the wool in its natural condition, but free from all filth and in good marketable condition. Adopted.

There was considerable discussion on this subject, but the most of it showed that if the majority of the wool growers insisted on presenting their wool to the buyers unwashed, that, like any other custom, it would be adopted by the purchasers, and a number of examples were cited as presenting no difficulty when the buyer understood his business.

Mr. Rich sustained the proposition, and said he would much rather stand the dockage than to take the risks incident to washing his sheep, and the losses occasioned by it.

Mr. H. R. Dewey objected to dockages in any form. Dockages for non-washed fleeces was a discouragement to those who took pains to put their wool on the market in the best condition, and put the seller entirely at the control of the buyer, and it did not matter of what quality or condition the wool might be, off came the stereotyped one-third.

Mr. Garlock would like to know where the buyers were who would buy or were authorized to purchase unwashed fleeces.

Mr. J. S. Wood, of Lodi, said he had experimented a good deal during the past thirty years that he had been growing sheep. He was well satisfied that washing his sheep was an injurious practice, and damaged the sheep twice the amount it benefited the wool. What was curious also, he had found by actual trial that fleeces which had been washed a month before shearing, and clipped at the end of it, actually weighed heavier than the unwashed fleece did when left on the sheep's back up to the same period of shearing. He could say that, as a matter of justice, that the unwashed fleeces shorn in May were really lighter than the washed fleeces shorn in June, and where the sheep had been allowed to run in pastures during the period.

Mr. Radford, of Marshall, said it was unquestionable that we should have to adopt May as the month for the shearing, as there was one difficulty that had been overlooked. He had found it impossible to keep unwashed sheep from becoming maggotty if the fleece is left on till June. Early shearing he was confident to say was better for the sheep. In June they were generally well fed, and if shorn in May the fleece got a nice start, and in the case of ewes the lambs got better fed, and besides the sheep had a heavier growth of wool to protect them during the early part of the fall and winter, and consequently required less feed.

Inquiry being made about buyers who purchased unwashed fleeces, Mr. Anthony named A. O. Hyde, of Marshall, as one of those liberal men in connection with the wool-buying interests, that had purchased unwashed fleeces, and was at all times ready to pay just what the wool was worth, buying it on its own value as to merit and condition.

Mr. Wood, of Lodi, had arrived at the conclusion that May was the time when sheep should be clipped.

Mr. Dryer, of Lansing, had shorn his sheep for a number of years earlier and earlier, by way of testing the season when it was best to do the shearing of his flock. The past year he had shorn his flock from the 10th to the 15th of April. His experience had learned him that he got the best prices for his wool during the early part of May. He had crossed his ewes with the Leicesters to get size, and the quality of mutton which was of the most value to the butchers.

The Hon. J. T. Rich, chairman of the committee on tariff, reported the following resolutions, which were unanimously adopted:

Resolved, By the Michigan Sheep Breeders and Woolgrowers' Association, that our Senators and Representatives in Congress are requested to use all honorable means to prevent any change in the present tariff on wools. [Applause.]

Resolved, That the President, Secretary and Treasurer of the Association have power to appoint one or more delegates to meet with any meeting of manufacturers or committee of the same, whenever in their opinion the interests of the Association will be subserved thereby.

Mr. J. P. Thompson, of Detroit, directed attention to the correspondence he had had with the Commissioner of the Census. This officer was directing his efforts to obtain a complete enumeration of the sheep in all the States of the Union. He was desirous of obtaining the aid of all those interested in the breeding of sheep and the growing of wool. The result would be published in the next census, and it was an interest that should call out the aid of every one who had that part of the farm work at heart. He offered the following resolution:

Resolved, That the Michigan State Sheep Breeders' and Wool Growers' Association do hereby advise and recommend that every flock-master in this State do render every aid and assistance possible in the enumeration of the sheep in his district by the marshals appointed to take the U. S. census of 1880, and also of the number of fleeces and pounds of wool grown during the year, so that a full and correct census of the wool products of the year may be secured.

Mr. D. P. Dewey, from the committee on programme appointed by the President, offered the following report:

Your committee, in accordance with the recommendation of the President in his address, submit that some system should be adopted for the exhibition of wools at the State, district, and county fairs, to be held the coming season, and place before you the following resolutions, as giving suggestions for general rules which may aid very much in rendering these excellent exhibitions of more value in this department:

Resolved, That all the samples of wools for exhibition at the State, district, and county exhibitions of agricultural societies be placed on black cambric, with the breeder's name and postoffice address attached to the sample, the weight of the fleece, the number of days' growth, the sex of sheep, and where practicable, the weight of the carcass; also that the samples be stitched to the cloth, so that it may be folded up or rolled, and thus kept free from dust or dirt.

Resolved, That it is hereby earnestly recommended that every member of this association do urge on their respective neighborhoods that all flocks should be sheared before the first day of June, so that the census returns may contain a full and accurate report of the annual clip of wool in this State for 1880.

The report and resolutions were accepted and adopted.

Mr. Radnor moved that the Secretary be directed to procure from the several railroad companies some concessions in regard to the rates at which members of this association will be conveyed to and from the annual convention; and also to make such arrangements as will secure them special terms from the proprietors of the several hotels at Lansing. Adopted.

The convention then adjourned *sine die.*

REPORTS FROM COUNTY AGRICULTURAL SOCIETIES.

SEVENTH ANNUAL CONVENTION OF THE ASSOCIATION OF AGRICULTURAL SOCIETIES OF MICHIGAN.

Pursuant to notice, the Seventh Annual Convention of the Association of Agricultural Societies of Michigan was held at the Court House in the city of Ann Arbor, Michigan, Tuesday evening and Wednesday and Thursday, January 20, 21, 22, 1880.

Convention assembled at the city council room in the Court House, at 7:30 P. M., and was called to order by the president, Chas. H. Richmond, who delivered the following able address:

PRESIDENT'S ADDRESS.

GENTLEMEN OF THE CONVENTION—In the flight of time, we are brought to the period for the seventh annual convention of the association of agricultural societies of Michigan.

I have to congratulate you upon the increasing interest in the objects of the association manifested by the agricultural and kindred societies of the State, in sending so large a number of delegates to this convention.

I have to congratulate you upon the very general success that has attended the efforts of the managers of fairs, institutes, societies and clubs for the promotion of the special objects for which they are created.

I have to congratulate you, as citizens of the State, upon the returning prosperity that is now so generally seen throughout this commonwealth in all the branches of industry.

While we have just cause for congratulation in what we see, in what we have accomplished, and in the glorious promises of the future, we have great reasons for thankfulness to the Giver of the harvest, for crowning the year with His manifold blessings; in prospering the work of men's hands in the field, in the workshop, and in schools of learning; especially have we reason for devout thankfulness that we were not visited by the scourge of pestilence which so generally afflicted a sister State the past year.

You come, gentlemen, to this annual meeting with the experience of another year in your several pursuits, to add to the general fund of knowledge.

The history of your successes and failures will be both interesting and valuable, because they are the results of observation. experiment and experience. You come from your several localities to concentrate and bring to bear upon all subjects presented for discussion, the wisdom and reflection necessary to give potency to the conclusions arrived at.

I am happily relieved from the embarrassing duty of presenting subjects for your consideration by your committee on topics, and by the kindness of the gentleman who is to address you on the question of "How can we make our county fairs better?" in the selection of his theme.

The secretary's report, besides statistics, will give much valuable information relating to the management of fairs.

Although the objects of the association are specified in an article of the constitution, and are in themselves very liberal and general, still its influence is exerted for the promotion and advancement of the greatest and most important of all human industries.

Agriculture is the basis of the wealth, strength and growth of the American republic. It is not only the first, but the most important interest and principal occupation of its citizens. It is the fruit of this industry that gives them independence as individuals and commands for the nation respect and consideration abroad.

Within the limits of the United States are found climates favorable and soils capable of producing all the cereals and fruits, grasses for grazing, cotton, hemp, and flax for manufactures, rice and sugar, and many of the tropical fruits; also forests of timber and mines of almost inexhaustible minerals. These are the true and bountiful sources from which is drawn the wealth, support, and luxuries of our people.

Farming in the United States generally may be considered to have made very great advancement within the last half century; it is still very far from perfect, and has not kept even pace with the discoveries and improvements in the other sciences and arts.

Of the many influences that have contributed to this great advancement, not the least in force may be mentioned the strong desire of the farmer to become the independent possessor of the soil; the conviction that he was obtaining and improving property, the complete possession of which is secured by the strongest legal guarantees; another, to the better cultivation of the soil and the application of improved machinery by the educated, as well as practical agriculturist, in all the operations of husbandry.

I have said farming in the United States was far from being perfect, for it is found upon comparison with the productions of countries that the average yield per acre of wheat is less in the United States than in any of the European States except Hungary and Portugal. In some of the German states the average yield is as high as 39½ bushels; in Great Britain it is 29, while in the United States it is only 13½ bushels per acre. I fear the same unfavorable results would be found were a comparison made as to live stock, especially in their higher improved types, if not in numbers. We may and undoubtedly have larger herds of cattle, but they are of inferior grades.

It is now estimated that the United States produces about one-fifth of the total cereals of the world, an amount equal to 40 bushels per capita of the population of the United States.

The money value of three of the principal grains raised in the United States in 1877 was—corn, $480,643,400; wheat, $395,158,375; oats, $118,661,550.

It may be interesting to know what was the highest and lowest price of each of them in the New York market from 1825 to 1879, a period of 54 years. Statistics show the highest price of corn to have been in the year 1864, $1.97, and the lowest price in 1876, 38c. a bushel. The highest price of wheat in 1866, $3.45, and the lowest price to have been in 1825, 75 cents. Of oats the highest price in 1864, $1.02, and the lowest price in 1877, 12c. a bushel; and the approximate average price of each during the same period was of corn, 74c; wheat, $1.46; oats, 47c. The highest price of mess pork during the same period was in 1864, $43.25 per barrel, and the lowest in 1842, $6.75. Of mess beef, highest price 1867, $28, and the lowest in 1872, $4 per barrel.

One of the most striking evidences of our rapidly increasing growth in agricultural industry is found in the amount of our annual exportation of domestic productions.

Besides producing what was sufficient for all wants of the people at home, there was exported in the year 1856, of domestic productions, the value of $281,219,423, being $29,212,887 less than of imported articles the same year. While in the year 1878 the exports of domestic productions amounted to the sum of $691,848,496, an excess over importations the same year of $257,821,314, showing the balance of trade to be now largely in favor of the United States, and equal to seven-eighths of the total exports of 1856.

About 82 per cent of the total exports was of agricultural productions.

A comparison between the exports of the products of the soil for the years 1830 and 1879 shows an increase of $511,686,380 during the 49 years.

This shows that our great agricultural resources and bounteous crops have enabled us to supply our own people with cheap food and largely to meet the wants of foreign countries.

The nation is youthful and vigorous; it cannot now suffer long and deeply from any cause, for it has too great recuperative powers; its productive resources are too great; its people too intelligent and enterprising; its inventive genius and skill too diversified; its muscular and mental activities too strong and farsighted to fear any external or foreign competition.

It is not the theory of our government, neither is it well to ask or expect it to show special favor or aid to the industries of any one class of its citizens.

The theory that our government is a paternal one in any sense I do not acknowledge. Such a government would destroy all independence in the individual and teach him dependence on government, and to look for the favors which may be extended or withheld at the caprice or whim of those who are in place or power. Such a theory is favorable to communism, which would be a deadly element here, as it has been in other countries.

It is not inconsistent with the theory that our government is not a paternal one in a literal sense to claim that the administrative policy of our government shall be such as not to interfere, blight or destroy the vital interests or legitimate enterprises of any of its citizens. We can rightfully claim a policy that shall give to every citizen the largest liberty for developing the material resources of the land and secure the freedom of an open field and a fair contest for a full share of the commerce of the world; demand a policy in state and national affairs that shall, in spirit and practice, receive the willing and hearty approval of the citizen as well as statesman, and promote the stability and perpetuity of the republic. "There can be no national liberty without the empire of law."

While we may be justly proud of our State for the variety, perfection and abundance of its agricultural productions, especially of the cereals, yet I think it must be apparent to any one who has reflected upon the subject that in the near future we are to have strong competition in the States of the west.

With their cheap lands, rich and productive soil, yielding so largely, and at such light expense for cultivation, together with the cheap transportation afforded them by railroads, must enable them to rival our own State.

Can you successfully meet this competition, aided as it is by consolidated transportation companies and railroad corporations, by giving them lower proportionate rates for transporting their products to the markets of the east, is the question presented to you, farmers of Michigan, for solution.

I am firmly convinced that a fair and full examination of the subject will force the conclusion that all rightful remedies against the unjust exercise of any corporate powers or privileges, as well as equalizing the natural advantages so far as possible, lie within the limits of State authority and individual exertion.

Ingenuity may exhaust its resources in inventing labor saving machinery and implements for cultivating the soil; it must be remembered the same machinery can be employed to greater advantage on the wide prairies of the west.

Our farmers must adopt such methods in their farm management as shall produce larger returns for their labor; a higher degree of cultivation; raise more and a better class of animals; a greater variety of grains, fruits, and dairy products, if they would maintain the present high rank of the State among the other productive and wealthy States.

I may mention one of the many advantages to accrue to the farmer by adopting a system of mixed farming, and one of no small consideration is in the profitable employment of hired labor for the entire year, and at lower wages. In this manner can be raised the "tramp" of to-day to the position of a respectable laborer, by giving him constant employment at fair wages and a home of comfort.

This system generally adopted will do much toward settling the vexed labor question in this country.

It is in the balancing of trades, the equalizing, the remuneration of labor, the encouragement as well as general employment of the idle, and a practical recognition of the principle that capital and labor are mutually dependent upon each other, that is to stay the antagonism sought to be raised in this country by unprincipled demagogues and leaders.

In a country like ours it is the duty of the farmer as much as that of any profession to add something to the beautiful as well as to the useful.

The time has arrived when the improved condition of the farm and the wealth of the possessor makes it necessary that the log house of the pioneer shall give way to a better farm dwelling.

It is commendable in the farmer to exercise frugality and economy in all the details of farm management. But when that frugality is the outgrowth of parsimony and descends to the low plane of stinginess in order to hoard money, at the same time depriving himself and family of the comforts of a respectable home, it is as despicable in him as in any one else. His comparatively isolated situation renders a just outlay of money necessary to secure not only the physical comforts, but to minister to the intellectual enjoyments of his family. In no way can a farmer better influence his children to become farmers, than to provide a cheerful and attractive home. Let the new home then be not only more commodious, but possess more of the comforts of modern life. The plain and substantial at once impresses the mind with the idea of stability and permanence, as does the convenient, useful and tasteful inspire love for the home that possesses them. Young and susceptible minds take in these impressions with an accuracy and force that give character to their future desires, and shape to a large degree their choice of a profession or occupation for life. Presumably true, is it that the young see in other professions and trades easier roads and pleasanter paths to eminence, distinction, and power. I do not advocate mansions or palatial residences for farmers, but buildings substantial, convenient, and comfortable, in keeping with good taste in their design and architectural proportions, exhibiting sense and judgment in the selection of the location, with surroundings that shall create in the beholder a sensation of sympathy with the pleasing attributes of grace and beauty in nature.

It is with pleasure I note the fact that in the older and longer settled portions of our State the spirit of useful improvement and refinement is strikingly manifested in many of the residences and buildings of the farmers.

For the purpose of encouraging this spirit it is to be hoped that this subject will receive from the managers of fairs proper consideration in the way of offering premiums for plans of farm buildings.

When we contemplate the great and varied resources of our State, in its agricultural productions; in its mines of copper, silver, iron, and coal; in its forests of timber and various manufactures, together with its herds and flocks, we may realize to some extent the magnitude of the productive interests which it is the principal object of your association to promote.

When we extend the thought to the vast territory of the Union, embracing about 500,000,000 of acres, nearly 200,000,000 of which is now subdued to the hand of man and constitute the farms and homes of over one-seventh of the population, yielding in agricultural products annually in value exceeding $3,000,000,000, upon an invested capital of over $9,000,000,000, and the employment of about 6,000,000 of its people, is it strange if we are filled with amazement at the possibilities of the future of our country.

Gentlemen, what a stimulus is found in the thought that in the United States the prosperity of the whole nation rests more certainly upon the success of the agriculturist than upon that of any other class or profession. Let the farmer then feel the responsibilities that rest upon him as a citizen, and let him realize the importance of his calling. in a national point of view, if no other motive induce him, to persevere in efforts to increase the nation's wealth, power and true independence; at the same time remember that he is one of a class by whose industry, economy and enterprise our country has been advanced from an unproductive wilderness to unexampled prosperity and power.

Let us then, gentlemen, look at the past only that we may select what is good, and avoid what is evil, that we may from its expiring sparks catch the inspiration of a wise progress, and school our hearts with lessons of truth and moderation; that wisdom may guide our course into the hidden future, with a spirit at once hopeful and humble; that we may at all times and in all vicissitudes realize the fulfillment of the promise, "While the earth remaineth, seed time and harvest, and cold and heat, and summer and winter, and day and night, shall not cease."

At the close of the President's address, the delegates presented their credentials to the Secretary, and were enrolled as follows;

Michigan State Agricultural Society—Hon. Philo Parsons, Ira H. Butterfield, Jr.
Michigan State Pomological Society—J. D. Baldwin.
Michigan Agricultural College—Prof. W. J. Beal.
Central Michigan Agricultural Society—Rev. L. B. Potter, Wesley Emery.
Eastern Michigan Agricultural Society—H. D. Platt, A. Campbell, N. C. Carpenter.
Fenton Union Agricultural Society—W. Blackmer, E. G. Miles.
Genesee Co. Agricultural Society—C. H. Rockwood, J. C. Dayton.
Kalamazoo Co. Agricultural Society—J. B. Cobb, Frank Little.
Eaton Co. Agricultural Society—Duane Hawkins.
Lapeer Co. Agricultural Society—I. H. Butterfield.
Livingston Co. Agricultural Society—M. Mitchell.
Newaygo Co. Agricultural Society—Shepherd Tibbets.
St. Joseph Co. Agricultural Society—E. A. Strong.
Washtenaw Co. Agricultural Society—C. H. Richmond, J. W. Wing, J. Parker.
Shiawassee Co. Agricultural Society—J. A. Armstrong.
Washtenaw Pomological Society—J. A. Scott, Hon. P. Page, J. Ganshorn.

President Richmond appointed the following gentlemen a standing committee on topics, to report to-morrow morning: Rev. L. B. Potter, J. C. Dayton, Frank Little.

An informal discussion was had upon various subjects to be considered by the committee on topics with reference to being embodied in their report.

Prof. Beal spoke briefly upon the importance to farmers of taking more pains in the selection of perfect grains for seed. That the quality and yield can be immensely improved by a systematic effort in this direction at comparatively small cost.

The convention then adjourned until to-morrow morning at 9 A. M.

WEDNESDAY MORNING SESSION.

The business of the convention was resumed at 9 A. M., President Richmond in the chair.

The following interesting report was made by the Secretary, Frank Little, of Kalamazoo:

MR. PRESIDENT AND GENTLEMEN:—The association of agricultural societies of Michigan was formed in 1874. This is the seventh annual convention of the society. It is a voluntary organization, consisting of a delegate representation from agricultural, horticultural and kindred societies. It aims to determine and perfect best methods for conducting agricultural fairs; to encourage a free interchange of views and experiences; the promotion of agriculture in all its branches, and the discussion of such topics as the exigencies of the times and the interests of agriculture, horticulture and rural life may demand.

At the convention at Lansing one year ago, which was well attended, a new constitution and rules were adopted, the board of officers enlarged and a new impetus given to the work of the association.

As in all other voluntary public organizations, where neither honor nor emoluments are to be derived, we have to rely upon the patriotic impulse, the self-sacrificing zeal of those who do not live solely for themselves, but have an earnest, I might say religious, desire to do good and benefit their fellow men.

While some of the early pioneers have dropped out by the way, wearied, it may be discouraged, while many societies have neglected to send delegates to our meetings, yet I am pleased to note a general awakening of public interest in the work of the association, a widening of its scope and influence, and we meet here in Ann Arbor today, Mr. President, a regularly organized, accepted and established institution of the State.

What secular or religious association or body can claim a more disinterested purpose—I may be pardoned in saying this—or is more clearly identified with or more zealously seeks to promote the material welfare of the people?

We are brought into close relations and have to do with what is fundamental in all its aspects. A business that lies at the bottom, the very bed-rock, of all individual and national prosperity. No other occupation can exist, no enterprise succeed independent of the farmer—the brawny tiller of the soil.

Mere intellectual development, scientific research, belief in the atomic germ, the correlation and conservation of forces, social refinement, or the highest forms of our so-called civilization have thus far been unable to change man's organism, to free him from the daily recurring necessity of nourishing his brain, his tissue, his very life with the commonplace products of the field. An eminent writer on this subject says: "It is impossible to measure or even estimate the importance of agriculture to a people. It is the foundation upon which civilization and society rest; the basis and source of the permanent wealth of a nation. No people in history have made substantial progress in civilization, arts and sciences, and remained long prosperous that neglected agriculture. It is the most ancient and universal of all arts, the parent of manufactures and commerce, the basis of all other industries, without which all else must decay and perish. The agricultural classes have uniformly been devoted to liberty, peace and good order in society; antagonizing disorder, wrong, violence and unjust revolution, they constitute the reserve forces of conservatism in all governments;" and, as another has well said, "the virtuous and intelligent farmer has attained the highest estate of fallen man."

Our agricultural societies are organized expressly for the purpose of investigation and practical tests in agricultural science; the dissemination of useful knowledge, the stimulating to higher aims and the advancement of everything that pertains to rural and farm life.

The local or county societies are particularly adapted to carrying on the work of an organization of this nature successfully. They are contiguous to, and can be easily and cheaply availed of by, the masses of the people. In all that pertains to public exhibitions and the free intercourse and interchange of views among agriculturists, they can be made more instrumental in promoting the general agricultural interests of the locality than can ordinarily be accomplished by State or larger district organizations remotely located. They offer a wide and pleasant field of labor for the scientist, philosopher, and earnest worker in the cause of human progress.

It is gratifying to record, from a careful examination of the returns of the several county societies, that the efforts put forth by the various officials in charge in this direction throughout the State have been and are so well sustained by the people.

In addition to what has already been said, our association aims to bring together officers of societies and friends of the cause we represent, that we may consult together and devise the wisest and best plans for the prosecution of our work. While we may take under consideration technical rules, regulations, and practices in the management of fairs, we may also consider other topics of general import connected with the common welfare of the people, especially such as are inseparable in their relations to the whole subject of agricultural life.

We live in a remarkable age of progress and human development. The primitive fathers and mothers delved and span in guileless innocence; ignorant of the revelations soon to be made, of the glorious sun of human enlightenment, civilization, science and arts, that in the near future should illumine the habitable globe.

While we note the wonderful increase of knowledge, the achievements of science, arts, inventions, etc., the enlargement of the intellectual capacities and functions. what shall be said as to a corresponding development of moral and religious aspirations and forces? The clergy and religious press mourn over the apparent decline of religious fervor in the people. That they absent themselves from public worship; withhold the necessary means for carrying on the work of evangelization; and that want of faith, indifference, and scepticism threaten the very citadel of orthodox belief. Evidences of moral defection may also be found in the peculiar and popular and popular ideas, methods, and practices adopted by politicians and political organizations to secure success, and the general endorsement by the people of the most ultra, dishonest partisan schemes and abuses.

Politically, we seem to have no respect, confidence, or toleration for one who casts a ballot different from our own. We hold him in this regard as an enemy; a seditious, dangerous person! The world looks on and says—politically—you are all arrant rogues.

In the midst of a decadence of religious belief, political debasement, unseemly scrambling after office, a seeming decline in official honor and honesty, bribery, theft, and a general decay of all the nobler attributes of our manhood, we have manifestly a grave duty to perform. We should try to build up and maintain the character and purity at least of the agricultural class; frown down all dishonest practices; curb unlawful ambitions; arouse moral sense; awaken manly aspirations, and in every way possible defeat and bring to naught the base schemes of designing men. Should we not inculcate a broader, freer type of citizenship? One that shall hold the elective franchise as a personal trust, to be exercised soberly, sensibly, and in view of all the responsibilities involved?

* * * * * * * * * * * *

The monotony, heavy drudgery, and small margin of profits attending farm labor, especially before the introduction of labor-saving implements, has turned many worthy young men to other pursuits. The lighter and more fashionable professions have been thronged with candidates. Young men, graduates of the schools, stand upon the street corners, or sit in genteel idleness at home, too proud, too knowing to engage in any useful occupation. They hope to get on in the world, to attain enviable renown perhaps, without work—an idea utterly fallacious, in contravention of all human experience and the express decrees of divine providence.

How may we best counteract these tendencies? how modify and soften the more objectionable features of farm life? How may we elevate public sentiment; show up in its true light the ennobling character and true dignity of the profession, and awaken a more general interest in agriculture, its enlargement and scientific development?

The agricultural societies of the State are steadily gaining in public favor and importance. The exhibitions of the past year, as a general rule, have been very successful. While a goodly number have sent in returns, still many societies have failed to do so, or to provide for sending delegates to the convention. It is true, our inculcations, decisions, and resolutions are not binding; they have no legal significance. Societies are free, of course, to conduct the business of their respective organizations in their own way.

Possibly some may have devised methods they do not wish to disclose; others are entirely satisfied with themselves and their plans, and so we do not quite get that hearty coöperation in the work of our association that we otherwise would. Still we are glad to note a healthy state of public interest, a patriotic zeal highly commendable on the part of those present; and I may say that the success of this meeting is already fully assured. It is to be hoped that in all our deliberations we may have a candid, free interchange of thought and ideas upon all topics that may be offered. We none of us perhaps feel entirely confident that our respective rules and regulations are perfect; that we cannot learn anything to our advantage. I think we are all of us more or less perplexed at times; we realize that we have to deal with a capricious public, thronging the gates to-day and leaving us in the lurch to-morrow.

Agricultural societies as a general rule do not receive that sure and reliable support that they are entitled to. Hence all sorts of make-shifts are resorted to by officers in charge to raise funds necessary to pay premiums and expenses. We ought to discountenance and banish from our annual fairs everything debasing, or that in any way detracts from the true dignity of the occasion. It may be that a Beecher, an Ingersoll, a balloon or a wedding—all well enough in their proper place—may attract a large number who would not otherwise attend; but do we not all sincerely wish that our people were so educated, so determined, so appreciative, and so thoroughly conscious of their own responsibilities that we should not need to resort to such practices as a mere speculation to replenish the treasury?

Again, there are prejudices and jealousies to overcome—unreasonable and unfounded as they may be—that the public entertain against the officers and their management. We are frequently importuned for special favors; to deviate from a well established, equitable rule; to influence awards, and to do many things—I had said manifestly mean and dishonest; a denial of which is sure to transform, it may be, a friend into an enemy.

A large number of our very worthy people are disposed to look upon the society as a private, money-making institution. That if they can secure all its benefits free of cost they certainly are fortunate ones. They do generously hope that *your* fair may be successful; and that you will get money enough to pay up everything. Should they contribute anything at the gate or buy a membership ticket, they have by so much enriched the officers; and they are entitled at least to honorable mention for their public spirit and liberality. Besides this, there is still another class of very deserving people, it may be too unassuming, too modest, to claim their just rights; who sadly and solemnly believe that the society confers its privileges and favors only upon the rich and influential.

There are many branches of farm industry that should receive special attention. Societies ought in every way possible to stimulate the breeding of an improved type of farm animals. A heavier class of business horses should be encouraged, as essential in the arduous labors of the farm.

Liberal premiums should be offered for approved pure blood cattle and their grades, while the breeding of natives should be discountenanced. Dairy interests have been sadly neglected. We have scarcely a supply of butter and cheese sufficient for home consumption.

An efficient and economical renovation of impoverished soils is an all-important question for every farmer whose lands are becoming enfeebled by a constant drain of organic material.

I will read in this connection a valuable letter from Judge Marston, of Bay City, to which I invite your special attention:

BAY CITY, December 11, 1879.

FRANK LITTLE, *Secretary, etc:*

DEAR SIR,—Yours of the 10th inst., inviting me, in behalf of your association, to deliver the annual address, is received. I should be most happy to comply, and would promptly and cheerfully accept, could I be present. This is not, however, among the possibilities, as the next term of the Supreme Court commences January 6, and continues until some time in February.

Am really sorry that I cannot meet with you, not because I would be at all likely to present anything new or entertaining; but I am deeply interested in the agricultural growth, progress and development of our State, especially the central and northern portions thereof, and recognizing the importance of our agricultural societies in promoting this work, I should like to aid them, even with my limited experience. I should expect, however, during the session, to learn much more than I could impart. At such meetings, each will have something to relate of interest, and by picking up and treasuring these stray items, we get a fund of practical information of inestimable value, thereby enabling us to manage our fairs more successfully than we otherwise would. To my mind officers of agricultural societies have to consider more important matters than merely how to make our fairs financially successful.

The importance of financial success I do not overlook or underestimate, as the life and welfare of the society depends thereon. There is something, however, beyond this; in offering premiums how can we best advance our agricultural prosperity; how sufficiently encourage the propagation of new and improved varieties of farm products and excellence in all things?

Can we induce some one to give us a new variety of wheat that will equal or excel the Clawson in yield per acre, and be its superior for flouring purposes? A potato that will take the place of the early rose and peachblow, now fast running out? Are there any new crops the growth of which should be particularly encouraged? Can we raise beets successfully and manufacture our own sugar? Can we induce our farmers to improve their stock by the use of thoroughbreds, and thus drive scrub and grade bulls out of the State? How may we have "gilt-edged" butter the rule, merely good butter the exception, and all other grades unknown?

These, my dear sir, are but a few of the many questions that should engage earnest, careful thought and discussion of the best agriculturists of our State.

Can societies, by offering liberal premiums, induce farmers to give us our supply of sugar? to add five bushels of wheat per acre to the present yield? 50 bushels per acre to the potato crop? 50 pounds of butter to the annual product of each cow, at the same time improving the quality of each? If so, then estimate what has thereby been added to the wealth of the State and to individual wealth and happiness.

There is another subject of vital importance to agricultural societies, especially in the new counties, in reference to which it might be well to take action. County societies are not designed or intended to benefit or enrich a few, neither do officers derive any pecuniary gain therefrom.

Societies struggling under indebtedness for grounds and buildings cannot offer sufficiently liberal premiums. Why should not the grounds at least be purchased and held by the counties? This has been done under special acts in some instances, why not in all? I speak solely in reference to the policy of such a system of purchase and ownership.

But I fear I am running beyond the limits of a private letter and will close.

Yours respectfully, ISAAC MARSTON.

The question has been frequently asked of late why societies as a general rule have abandoned the practice of having an address given at the time of the annual fairs. It may be answered that there has been a large increase of business in the conduct of fairs, as compared with former years. By far the largest number of people attend the exhibition on Thursday of the week. That is the day usually set apart for the address—a day that taxes the official management to the utmost, in time and energy. The public have come by trains or in wagons, long distances, to see the show, and they will have little time to spare from that object. Then, again, it is next to impossible to secure capable, reputable gentlemen to deliver the addresses.

Some years since your secretary received a letter in answer to an invitation to address the agricultural society at Kalamazoo, from the Hon. John Wentworth, of Illinois, which bears so directly upon this question that I may be pardoned in quoting from it:

CHICAGO, July 27, 1864.

DEAR SIR:—I thank you for you complimentary note, but I have been present too often for the last twenty years at the delivery of agricultural addresses for me to accept of your invitation. Most societies have abandoned that part of their early programme, and I concur in their wisdom. People want to see the show, and not to hear addresses. I have had innumerable invitations from States and societies, and have always declined, because I have seen how illy able much better men than myself have been to compete with the animals that the public come to see.

Your obedient servant, JOHN WENTWORTH.

If it is deemed impracticable to have an address at the time of the fair, still every society can organize a club or literary department and hold stated meetings—say semi-annually—at which time formal addresses, papers and discussions may be had, which shall be of practical benefit to the cause of agriculture.

I fully concur with Secretary Garfield of the State Pomological Society in the views as set forth in a letter dated Grand Rapids, December 26, 1879:

DEAR SIR:— * * * * There is no doubt but great good may be brought to agriculture and arts through the medium of exhibitions; but we are living far beneath what we ought to in this regard. The English and Canadians have a better idea of fairs, making them great market occasions.

One point I would urge strenuously, were there a place in your programme, and were I present at your convention—that each county or district society have a winter institute to extend through two days and evenings, at which time the election of officers should occur, some prominent lecture be given upon rural affairs, and practical discussions had upon special or general topics.

If this plan as outlined could be carried out as industriously as the programme of the fair, our county societies would be more in the hearts of the people, and do more for agriculture. Respectfully,

CHAS. W. GARFIELD.

* * * * * * * * * * * *

We should unqualifiedly commend the State Agricultural College, the faculty, officers and Board of Agriculture, as in every way essential to the advancement of agriculture and the dissemination of useful knowledge, and deserving the hearty and generous support of the people of the State. The annual volume of transactions, essays, proceedings of Institutes, etc., issued by the State Board of Agriculture, is a book of rare merit, not excelled by any publication of like character in this country—national or state—and we can but regret that the edition is so limited that we have but few copies, comparatively, in each county to distribute.

This association is under special obligations to Prof. Baird, Secretary of the State Board of Agriculture, for his uniform kindness and the valuable assistance rendered us in the full publication of proceedings of the annual conventions.

A statistical table is herewith submitted embracing the names and location of all the societies of the State, so far as ascertained, and the detail of their transactions for the year of 1879, so far as returns have been sent to this office.

The Lenawee County Agricultural Society experienced a sad disaster at its last fair in the breaking down of the grand stand while occupied by a large body of spectators, by which accident many valuable lives were lost and a large number of persons seriously injured. I am advised by the secretary, Mr. Mann, that they leased the grounds; that no blame can be attached to the society, and that the people generally of the locality exonerate them. They have devoted all their surplus this year in aid of the sufferers.

But my report has been extended to an unwarrantable length. I close, expressing the sincere wish that our deliberations here may be pleasant and profitable to all who have come hither, and that we may be able to render some substantial service, not only so far as relates to societies and their management, but to the great cause of agriculture and its development of our State.

[For financial report of the agricultural societies of the State see tabular statement annexed.]

TABLE *Giving date of organization, name of Agricultural Society or Association, place of holding Annual Fairs, and P. O., and the number of exhibitors, receipts, prizes offered and awarded, contingent expense, amount paid for permanent improvements, indebtedness, the amount paid on indebtedness, for 1879, and value of property owned by Society.*

Date of Organization.	NAME OF SOCIETY OR ASSOCIATION.	PLACE OF HOLDING ANNUAL FAIRS AND POST OFFICE.	No. of Exhibitors in 1878.	Total Receipts for 1879.	Amount Offered in Prizes for 1879.	Amount Awarded in Prizes for 1879.	Total of Contingent or Running Expenses 1879.	Amount Paid for Permanent Improvements 1879	Indebtedness 1879.	Paid on Indebtedness 1879.	Value of Property Owned by Society.
	Agricultural College and State Board Agriculture	Lansing.									
1848	State Agricultural Society	Detroit.									
1870	State Pomolonical Society	Detroit	90	----------	$1,000 00	$925 00	$500 00	$50 00			
1873	Alcona County Agricultural Society	Harrisville	149	$497 22	200 00	125 00	148 00	255 00	----------	$255 00	$1,000 00
1873	Allegan County Agricultural Society	Allegan.									
1842	Adrian Horticultural Society	Adrian.									
1873	Armada Agricultural Society	Armada.									
1856	Barry County Agricultural Society	Hastings	455	2,252 98	1,050 00	914 80	325 54	587 10	----------	226 80	5,000 00
1866	Bay County Agricultural Society	Bay City	----	1,200 00	1,500 00	620 25	1,200 00	100 00	$2,000 00	----------	15,000 00
1850	Berrien County Agricultural Society	Niles	125	1,302 43	1,600 00	953 80	166 16	200 00	2,000 00	----------	4,000 00
1865	Benzie County Agricultural Society	Benzonia.									
1851	Branch County Agricultural Society	Coldwater.									
1874	Brighton Market Fair Association	Brighton.									
1848	Calhoun County Agricultural Society	Marshall	330	2,348 23	1,430 00	1,050 50	604 50	856 53	400 00	----------	6,000 00
1850	Cass County Agricultural Society	Cassopolis.									
1866	Central Michigan Agricultural Society	Lansing.									
1873	Deckerville District Agricultural Society	Deckerville.									
1855	Eaton County Agricultural Society	Charlotte	319	1,764 90	1,500 00	1,017 50	455 00	438 00	2,300 00	----------	9,000 00
1865	Exp. Agricultural Association of Ionia, Montcalm, etc.	Otisco.									
1871	Eastern Michigan Agricultural and Mechanical Association	Ypsilanti.									
1858	Fenton District Agricultural Society	Fenton	325	1,795 00	1,000 00	877 00	200 00	500 00	1,500 00	----------	7,000 00
1850	Genesee County Agricultural Society	Flint	200	3,872 65	----------	1,200 00	1,070 00	600 90	3,066 00	1,000 00	10,000 00
1866	Gratiot County Agricultural Society	Ithaca.									
1868	Grand Traverse County Agricultural Society	Traverse City	404	998 81	500 00	268 25	461 59	317 21	1,500 00	1,000 00	2,500 00
1874	Grand River Valley Horticultural Society	Grand Rapids.									
1851	Hillsdale County Agricultural Society	Hillsdale	750	5,750 50	4,000 00	2,058 21	1,222 75	3,895 04	2,000 00	----------	35,000 00
1871	Hubbardston Central Fair Association	Hubbardston	2470	3,370 00	7,000 00	1,890 00	978 81	250 00	400 00	40 00	6,000 00
1854	Ingham County Agricultural Society	Mason	----	1,490 00	1,200 00	900 00	420 00	----------	1,700 00	170 00	4,000 00
1856	Ionia County Agricultural Society	Ionia.									
1852	Jackson County Agricultural Society	Jackson.									
1845	Kalamazoo County Agricultural Society	Kalamazoo	298	2,947 60	1,826 50	1,426 75	1,226 37	----------	----------	----------	1,523 87
1848	Kent County Agricultural Society	Grand Rapids.									
1871	Lake Shore Agricultural and Pomological Society	Saugatuck.									
1858	Lapeer County Agricultural Society	Lapeer.									
1849	Lenawee County Agricultural Society	Adrian	565	3,000 00	2,650 00	1,116 75	1,000 00	----------	----------	----------*	
1852	Livingston County Agricultural Society	Howell	225	1,419 75	1,200 00	804 00	415 75	----------	1,250 00	200 00	5,000 00
1870	Mason County Agricultural Society	Ludington									
1850	Macomb County Agricultural Society	Mt. Clemens	419	1,200 60	800 00	600 00	400 00	----------	200 00	----------	300 00

1874	Mecosta County Agricultural Society	Big Rapids.									
1875	Michigan Central Union Fair Association	St. Louis.									
	Monroe County Agricultural Society	Monroe	300	910 00	700 00	502 18	214 00	50 00	5,840 00	----------	8,000 00
	Muskegon County Agricultural Society	Muskegon.									
1871	N. Branch, Burlington, etc., Agricultural Society	North Branch.									
	N. Berrien and Michigan L. S. Agricultural Society	Benton Harbor	225	2,999 52	1,427 50	645 50	367 97	1,234 06	587 91		
	Newaygo County Agricultural Society	Newaygo	150	450 00	100 00	100 00	75 00	----------	----------	----------	1,500 00
1849	Oakland County Agricultural Society	Pontiac	367	3,733 50	1,950 00	1,456 50	1,248 09	375 25	3,450 00	50 00	10,000 00
	Oceana County Agricultural Society	Hart	300	784 00	328 00	----------	250 00	300 00	1,000 00	----------	2,500 00
1867	Ontonagon County Agricultural Society	Ontonagon	----	†75 00	----------	----------	----------	----------	----------	----------	200 00
	Osceola County Agricultural Society	Evart.									
1856	Ottawa and Muskegon Agricultural Society	Berlin.									
1870	Paw Paw Valley Agricultural Society	Lawrence.									
1873	Springport Union Agricultural Seciety	Springport.									
1849	St. Joseph County Agricultural Society	Centerville	1615	5,629 77	3,070 00	2,517 00	1,602 09	1,081 07	900 00	502 80	10,000 00
1868	Sanilac County Agricultural Society	Lexington	125	399 50	547 75	290 00	52 00	20 00	----------	----------	1,200 00
	Saginaw County Agricultural Society	East Saginaw	180	1,705 00	900 00	860 00	855 00				
1876	Sanilac Central District Agricultural Society	Farmers.									
1870	South Haven Pomological Society	South Haven.									
1866	Tuscola County Agricultural Society	Watrousville	150	1,200 00	1,000 00	800 00	200 00	200 00	----------	----------	1,600 00
1874	Union Agricultural and Industrial Society	Plainwell	400	1,841 41	700 00	510 75	448 99	262 00	900 00	594 67	2 500 00
	Union Agricultural Society	Fremont Center									
1850	Van Buren County Agricultural Society	Paw Paw	380	1,636 00	700 00	595 00	500 00	24 00	2,625 00	500 00	10,000 00
1847	Washtenaw County Agricultural Society	Ann Arbor	----	2,274 77	----------	990 25	460 59	201 47	3,000 00	321 50	8,000 00
	Western Michigan Agricultural and Industrial Society	Grand Rapids	485	----------	12,000 00	----------	3,000 00	4,000 00			

---

* Paid on accident, $941.00.

† No Fair.

President Angell, of the Michigan State University, at Ann Arbor, extended a cordial invitation to the convention to visit the University at 2 o'clock this afternoon, which was thankfully accepted.

Rev. L. B. Potter, chairman committee on topics, made a partial report, and the convention entered upon the discussion of the same, a brief mention of which is only given.

TOPICS DISCUSSED.

1. Does this convention recommmend that horse-racing be made a leading part of our county fairs?

The emphatic answer from the delegates was no.

2. Does the convention recommend that agricultural societies rent booths or stands for the sale of beer and cider on the fair grounds?

Considerable discussion followed the reading of the second question, when J. D. Wing, of Scio, and a member of the Washtenaw county agricultural and horticultural society, submitted the following resolution as a substitute, which was unanimously adopted:

Resolved, That it is against the best interests of our agricultural societies and the success of our fairs, to allow or permit saloons or stalls for the sale of intoxicating drinks, or wheels of fortune, or any other device for gambling to be allowed upon our fair grounds during our fairs.

The question "Does the offering of large premiums and few in number, or the same amount distributed into less amounts each and more in number, best subserve the interests of the society and the exhibition?" was referred to the committee to draft a resolution covering the subject.

At 11 A. M. the regular order was suspended, and Prof. Beal, of the Agricultural College, delivered the following address, entitled:

HOW CAN WE MAKE OUR COUNTY FAIRS BETTER?

Mr. President and Members of the Association,—I have not the least idea that what I shall say at this time will tell any of you how to make county fairs a complete success, but I hope to throw out some hints which, if carried out, will make our fairs better. We learn of each other. One of the most hopeful signs of the progress of our fairs is the existence of this association which meets annually for counsel. No doubt some of our county fairs are much improved by the fact that one or two of the leading officers visit other fairs in this State or in neighboring States. The further away from home a person goes to visit a good fair the more likely he will be to get some new idea. For example, our friend Col. F. W. Halloway, who has been so long secretary of the county agricultural society of Hillsdale, would learn much more attending a fair in the province of Ontario than he would by visiting a fair in Adrian or Coldwater. Such visits by the officers will always improve any agricultural society. It is a good investment, every year, to send a wide-awake man and pay his expenses, to visit some fair, take notes, and report at the annual meeting. Why could not this association economize by sending some one?

What constitutes success? On this question there are various opinions. A great many measure the success of a fair by the size of the crowd in attendance and the money taken in at the gates. The presence of a great number of persons and large receipts are certainly encouraging symptoms of the life of a fair. They are not to be ignored, but they are not sure guides to success in the highest sense.

What are the objects of a fair? Is it to amuse everybody? Is it to pay exhibitors large premiums? It seems to the speaker that the success of a fair depends on furnishing the greatest amount and variety of useful information to the numbers who are in attendance. As I look at it, the main objects of our fairs are to educate the people.

For 10 years I lived in the State of New York. I once attended a fair which was considered by many a great success. The crowd was one of the largest which had ever attended. The money receipts were gratifying. I looked around to see the show in various departments—to see what the mass of the people were doing. They were engaged in various amusements, such as riding on swings, shooting at a target at 30 feet distant, with a miserable, cheap, and defective sort of pop-gun. They were trying their strength by a lifting machine, gathered around a machine to test the blowing capacity of their lungs, etc. Among the amusements at some fairs I have seen a floor with music and dancing, races by fat men, foot-ball, or climbing a greased pole. At a fair where a lot of these cheap amusements were in full blast, the small hall containing the fruits, grains, and vegetables was thinly attended, and there were very good reasons for this. There was no taste shown in arranging the exhibit, the shelves were not all filled, things were jumbled together in confusion. The inside of the hall was dingy and forlorn. The light was deficient. Fruit was shown on the shelves without plates and without labels which could be seen by the visitors. Vegetables were shown in all sorts of vessels, some much resembling swill pails brushed up for the occasion.

How was it about the judges and the awards? At the eleventh hour the speaker was asked to act as third man on a committee to judge apples. In the printed rules for the class under consideration 12 apples were required for competition. One man had only six specimens. These were good. The chairman and the second man knew the exhibitor of these specimens and knew that he had plenty of good fruit of the same variety at home. It was only an oversight of the rules that he neglected to bring the 12 samples required; besides the exhibitor was a good man and he ought to have the first prize. Finally the exhibitor came around and said that he had plenty of apples at home. The majority of the committee awarded the first prize to the man who exhibited six apples when the printed premium list demanded 12. The third man on the committee was disgusted. This is only one instance, but even one is enough to disgrace any fair.

In too many cases the "biggest" squash, potato, beet, cabbage, radish, apple receives the first prize regardless of quality or defects.

The arrangement of objects is too broad a theme to go over in detail, and I could not do it justice if I should try. The objects in all departments should be arranged with room enough and light enough.

In the exhibits of fruits at our State fairs, managed by the officers of the State Pomological Society, there has within a few years been a marked improvement in the arrangement, labels, etc. These plans are worth reading, and can be found in several of the late reports. I will only refer to them. We now have plates to hold the specimens, and a clip fastens to each plate to hold the card in position where the name can be read, with no prospect of being removed.

It would be a great accommodation if owners of horses would, in fair weather at fairs, bring out their animals near the stalls and let people see them for an hour at a time at two different times each day. Let the time be stated on all the programmes.

In the abundant use of neat and plainly printed labels there is a chance for some society to distinguish itself.

A fine placard near an animal or pen of animals is the exception, and not the rule. These placards should contain the name of the animals, ages, breed, weight, name and residence of owner, with any other item suggested by the frequent questions asked by hundreds of spectators. Too much care cannot be taken to see that suitable labels are printed. Let them be large and conspicuous. Suppose the society provide a man with suitable cards, brush and paint. He goes from one pen to another, marks the cards, and they are posted in proper places.

We often hear great complaint about incompetent judges at fairs. Some of the complaints are well founded; some are not.

It will generally give best satisfaction to employ some well known expert who lives beyond the county or State which conducts the fair. This expert may act as chairman, and one or two others, perhaps, may be selected near home.

In case of vegetables on exhibition many of our managers of fairs yet have much to learn. There should be some well defined plan for testing them besids a mere look at the shape and size.

Any written report of a committee besides a mere mention of the awards is the exception and not the rule. The expert chairman can make a report which will be instructive and valuable to all exhibitors. These reports might teach the people as much as a hasty view of the exhibition.

For what shall we offer premiums? Of course we should give premiums to most or all of the objects of merit usually on exhibition. We ought to interest every class of people. I wish something could be done to call more attention to the value of a good vegetable garden for the farmer. Offer rewards for the best-kept fruit yard for a farm-house, having especial reference to economy of expenditure. Require a report of plans, plants and cost in money and labor.

Offer rewards for the best arranged farm barns, sheds and out-buildings; for the best planned kitchen and the accompanying conveniences, reference being had to cost as well as convenience.

In some way, we need to call more attention to helps for the women. Too many are taking useless steps on account of a little want of thought or attention.

Farmers surely need to keep a more accurate account of their expenses and income. To encourage this offer liberal rewards for the first, second, third and fourth set of farm books covering a year.

To interest and encourage the boys and girls, offer awards for a great variety of laudable undertakings.

In awards for fat cattle and sheep of different breeds, is it not practicable to exhibit them for a day or two alive, and for the next day or two exhibit their meat dressed in good order? Then there would be a chance for those who desired to bet and speculate and try their skill on the relative merits of animals.

We are all interested or ought to be in the success of our county schools, our graded schools. If we can do something in our fairs to help this along, we shall accomplish much good,

Many of our school houses are forlorn looking objects, inside and out, as well as the yards which surround them.

May I hope that some officers of our county fairs will set this good work in motion at their next fairs, by offering awards to the greatest surroundings of a county school house, you will find some very interesting papers on this topic in the report of the Michigan State Pomological Society for 1879, soon to be published.

At the late meeting of the State Teachers' Association we wished to encourage our schools by inducing the officers of our various fairs to offer premiums for school exhibits. These may consist in drawings, spelling matches, singing, declamations, penmanship, essays on insects injurious to farm and garden and orchard crops, or collections of injurious insects or collections of minerals, stuffed animals or other objects of interest. In most of the cases above mentioned no award need be offered. If attention was called to the subject in the premium list and a committee was early appointed to solicit exhibits no doubt they could be secured. For this purpose, or these purposes, a suitable hall should be provided. I dare say it can be made to draw equal to a horse race, or a base ball club at any rate. It will draw some who will not be drawn by the above amusements. In case the officers of any agricultural society wish to encourage school exhibits and want hints or help to start, I suggest that our State Superintendent of Public Instruction, C. A. Gower, at Lansing, or the President of the State Teachers' Association, Prof. A. B. Thomas, at Saginaw, would render any assistance in their power. I volunteer this suggestion without their knowledge or consent.

Quite likely some of my suggestions have already been tried by a part or all of the county societies. Some of the suggestions it would no doubt be impracticable to carry out, but I trust a few of them will prove worth trying and result in making our fairs more profitable. We all like to see things grow. We do not feel well satisfied to go year after year to see the same sort of a show, while in some cases it is not much of a show after all. Progress and zeal, hard systematic work of skilled officers, will awaken enthusiasm and call out the people to the annual fairs. If year after year they go to the fairs and learn something which is valuable they will keep going and induce others to go. Depend upon it, if your county fairs are lagging in interest there are some good reasons for it. The good natured public are critics, and generally know a good thing when they see it.

The art of agriculture is developing rapidly. None can keep up with the times in which we live without reading and study. Those who will not move upward and onward will be left behind or trampled in the dust.

The association tendered a vote of thanks to Prof. Beal for his able, instructive and practical address.

Discussions were resumed and at 12 M. convention adjourned until 1:30 P. M.

AFTERNOON SESSION.

The convention met at half past one o'clock, when the discussion of the fourth question was taken up.

Is it for the best interests of the society, or does it promote the advancement of agricultural, mechanical or manufacturing interests in the county or district for a society to give cash premiums for articles, implements or machinery not manufactured in the county, and where the judges have no opportunity for practically testing the utility of the same?

This was decided negatively.

The association recommended that county conventions adopt a rule that all entries of animals and articles shall be made by the owner, or in his name by his authorized agent, and that the owner thereof shall be entitled to the premium.

"Has not the time come when agricultural societies should require all entries of live stock to be made at least one week prior to the opening of their fairs?" It was resolved that this convention recommend a rule for societies to require entries to be made as above.

The time fixed having arrived for visiting the university, an adjournment was taken until evening.

[At 2:30 P. M. the convention in a body visited the university. They were cordially welcomed by the President Angell, and by him conducted through all the various departments of the institution. We will not attempt a description of the Michigan University. It stands unrivalled in excellence, and its fame is world-wide. After a pleasant sojourn of two and one-half hours, the members of the association returned to the city.]

EVENING SESSION.

Convention assembled in the main court-room and was called to order by President Richmond at 7:30 P. M.

The president announced the following standing committee on legislation: C. H. Rockwood, chairman; I. H. Butterfield, Jr.; E. A. Strong.

An informal discussion was had upon the question of public aid by tax of agricultural societies to the extent of providing grounds for fair purposes to be owned by the counties.

President Angell, of the University, was then introduced and delivered an address which was listened to with intense interest throughout. We regret that we can only subjoin a brief abstract as taken from the reporter's minutes.

The following is a synopsis of President Angell's address before the convention of agricultural societies:

He felt, as he came before an audience of skilled farmers, somewhat differently than when appearing before almost any other audience. He believed fairs to be educational, where a great deal that was valuable could be learned. The question is, What sort of education does the farmer need, and how far is he to carry it with the means at his disposal? There are three classes of farmers. The lowest class is made up of a class of men who never did have and never will have much intelligence. In New England some men carry on farming the same as their fathers did 75 years ago. They seem to be shut up in seclusion, apparently indifferent to things around them. Seclusion, however, is not without its benefits. If a man does not have anything in his mind to revolve, this seclusion will have no particular benefit. He laid great stress on educating the young farmer boys. Brisk young men for teachers in the country would have a beneficial effect.

The second class of farmers is made up of those who are filling the great storehouses of the land. They are ready, as a rule, to seize upon the best working methods that can be made clear to them. What they want is good, average-size stock, large crops well stocked, and standard prices. What is it that goes to make up such a man? First, he wants good common sense and native gumption to begin with, and a fair education. It is no misfortune to know things outside of farming. Farmers should know the rise and growth of facts, methods, and rules which from sound experience have been found to be wise and useful. He should understand in a general way the effect of the currency upon the crops. Another instrumentality is the common district school, the people's college, and which needs looking after much in this State. Teach how plants are grown, of what air consists, what makes the wind blow, and what causes rain; on frost, dew, of the stars, not profound talk in astronomy, but of what they are. The district school is the place for training children for the active duties of life.

A man is educated whether he has been to school or not if he has the tools and can apply himself, who has got a mind that he can use for his daily work. The training of children to learn the daily affairs of life is what is needed.

Farmers' institutes are a good source of knowledge, and should be encouraged, for they are capable of being made of the very highest value. There is nothing like oral expressions to make questions abstruse understood.

A vote of thanks was unanimously extended to Pres. Angell for his able and interesting address.

ELECTION OF OFFICERS.

The association then proceeded to the election of officers by ballot for the ensuing year with the following result:

President—L. B. Potter, Lansing.
Vice-President—C. H. Rockwood, Flint.
Secretary and Treasurer—Frank Little, Kalamazoo.
Executive Committee—I. H. Butterfield, Port Huron; William H. Cobb, Kalamazoo; J. C. Dayton, Flint.

The President appointed the following as standing committees for the ensuing year:

On Topics—Prof. W. J. Beal, Agricultural College, Chairman; J. M. Sterling, Monroe; Frank Little, Kalamazoo.
On Legislation—C. H. Rockwood, Flint, Chairman; I. H. Rutterfield, Port Huron; E. A. Strong, Centreville.

The time and place of holding the next convention was placed in charge of the Executive Committee.

The Committee on Topics to prepare list of questions and furnish same to Secretary in time for publication in "call" for next annual meeting.

On motion of Mr. Potter, it was voted to dispense with the collection of statistical items for the coming year.

The convention recommended that agricultural books and papers be given as premiums at agricultural fairs.

Prof. Beal moved, that this convention recommends legislation, State and national, to prevent, so far as may be, the spread of contagious diseases among farm animals. Adopted.

The convention then adjourned until to-morrow (Thursday) morning, at 9 A. M.

THURSDAY MORNING SESSION.

Pres. Richmond called convention to order at 9 o'clock A. M.

Discussion of topics resumed.

The following resolution was adopted:

Resolved, That to establish and encourage a reciprocity of interest, and to promote good feeling in communities lying contiguous and accessible by railroad communication, this association recommends that officers of societies appoint the time of holding the fairs so as not to conflict with each other, but to permit and encourage extensive visiting from one society to another.

A resolution was adopted recommending to all the county and district agricultural societies to hold winter institutes annually, and also that it is the judgment of this convention that every agricultural society should, as soon as they can, select men to do their judging who are really experts in this particular class,—men that can and will explain intelligently the reasons for the decisions they make,—and such capable judges cannot often be obtained until we arrange to pay their expenses.

It was resolved that it is the sense of this convention that by careful and judicious selection and cultivation of the best ears of the best varieties for seed, by better preparation of the seed bed, by the cultivation of the plants and the intelligent and sufficient use of manure and other fertilizers, it is possible for the farmers of Michigan to add fully 50 per cent to the present average yield of the wheat crop of the State.

The discussion of other topics proposed by the committee was postponed until the next annual meeting.

The subject, "How can we cross Clawson wheat with the Treadwell?" was discussed briefly by Prof. Beal, who explained to the convention the modes of crossing grains.

J. A. Scott of Ann Arbor gave his experience of raising corn on the Maumee bottom.

Philo Parsons of Detroit, J. W. Wing of Scio, Aaron Campbell of Pittsfield, Frank Little of Kalamazoo, and Prof. Beal spoke at length upon the Clawson wheat, which in the past year had materially improved in quality, being more flinty and making better flour.

Mr. Parsons offered a resolution, which was adopted: That we have great faith in and should foster and encourage the Michigan State Agricultural Society; that as the crown of the County Societies, it seeks to develop all our material resources.

The following was unanimously adopted:

Resolved, That this association appreciates the efforts of the faculty of the Agricultural College, not only in training their students, but also in the time given to Institutes and experimental tests. We would earnestly recommend that more liberal means be given the authorities of the College for the purpose of these practical tests and experiments, and that the results be given to the farmers of the State.

A vote of thanks was extended to Mr. Richmond, president of the convention, for his indefatigable efforts in making the meeting a success.

The time and place for holding the next annual convention were left with the executive committee.

Convention then adjourned *sine die*.

CHAS. H. RICHMOND,
FRANK LITTLE, *Secretary*. *President, Ann Arbor, Michigan.*

KALAMAZOO, MICH., January 22, 1880.

BAY COUNTY.

The very able and exhaustive article furnished for the Report of 1877, in relation to the history of Bay county and the Bay County Agricultural Society, relieves me of any labor in that direction further than to say that the erroneous idea in regard to the worthlessness of Bay county lands for agricultural purposes, which had gained general credence throughout the country previous thereto, has, since that report was published, been more fully refuted, and the fact has been established beyond a peradventure that the lands of Bay county for agricultural purposes are equalled by few and excelled by none of any of the counties in the State. Not only has this fact been demonstrated by the opening up of new territory to agricultural development, and the increased demand for farming lands, but also by the enormous and almost unprecedented yields of wheat and other cereals, and vegetables, reported and exhibited at our county fairs the past two years.

Since the report above alluded to was published our charter has been somewhat amended to comply with the suggestions therein contained, and other important objects have been accomplished which has not only proved of immense pecuniary benefit to our society, but establishes it on a sound and secure basis and places it beyond the possibility of failure in the future.

A special act of the Legislature passed at its last session enabled Bay county to receive our agricultural society's grounds and buildings in trust for the society and assume the indebtedness on the same. This question was submitted to a vote of the people of the county, and resulted in favor of the measure by an overwhelming majority. In pursuance of this result the proper documents were presented to the Board of Supervisors of the county and accepted by an almost unanimous vote. This action has relieved the society from any pecuniary embarrassment, and we are gratified to be able to report that the Bay County Agricultural Society is in a healthy, vigorous condition, possessed of handsome grounds, beautifully situated, with a fine half-mile track in perfect condition, with grand stand, judges' stand, speaker's stand, etc., and also with beautiful new and substantial buildings for fair purposes, viz: Agricultural Hall, Floral Hall, President and Secretary's offices, three refreshment buildings, stables, sheds, pens, etc., all of which are of admirable adaptation, and this too with no burthen of debt resting upon them.

The board of supervisors have also, with great generosity this year, ordered a slight tax spread upon the rolls, which, although so small to individual taxpayers, yet, in the aggregate will materially benefit the Society.

It would be unjust in me to close this portion of my report without saying, that in all the measures which have so essentially tended to the advancement of the Society's interests, and to whatever of success it has attained, it is mainly indebted to the untiring exertion and indefatigable zeal of our retiring president, Hon. Isaac Marston. We are enabled to say this much, without any intention in the least to detract from the self-imposed and unrequited labors of the gentlemen who have been associated with him, as officers and directors.

The ninth Annual Fair of the Bay County Agricultural Society was held on the Society's grounds at Bay City, from September 23d to the 26th, 1879, inclusive.

The weather proved cold and rather inclement on two of the days mentioned, which doubtless very materially affected the receipts, but the Fair withal, was considered a decided success.

The whole number of entries was 749, on which was paid in premiums as follows:

	No. of Entries.	Am't of Premiums.
Cattle	60	$93 00
Horses	81	178 00
Sheep	16	21 00
Swine	18	20 00
Poultry	55	17 00
Field crops	84	60 00
Vegetables	131	61 00
Fruit	41	27 00
Dairy products	50	52 00
Agricultural and farm implements	19	------
Domestic manufactures	5	2 25
Stoves and tinware	7	------
Plowing	3	------
Ornamental needle-work	104	74 00
Works of art	22	15 00
Musical instruments	4	------
Boots and shoes	7	------
Dry goods and millinery	9	------
Miscellaneous	33	------
	749	$620 25

The above does not include special premiums presented to the Society, and awarded for plowing, etc. Neither does it include the diplomas and other articles of value presented by the Society to successful competitors.

The total receipts and expenditures of the Society for the year 1879 are as follows:

Total receipts	$1,202 41
Total disbursements	1,174 20
Balance on hand	$28 21

I herewith present some of the grains, with the weights of each, as exhibited at our fair, with the statutory weights of the same:

Wheat.

Name.	Weight per Bus.	Statutory Weight.
White Mountain	64¼	60
Treadwell	63	60
Clawson	60	60
Treadwell	64⅛	60
Clawson	61	60
Clawson	61	60
Treadwell	63¼	60,
Treadwell	64⅛	60
Clawson	60¾	60
Clawson	60¾	60
White Russian	59¾	60
Minnesota Club Spring	60½	60
Clawson	62	60

Oats.

Name.	Weight per Bus.	Statutory Weight.
Schœner	37¼	32
Name not given	34½	32
White oats	33	32
White oats	35	32
Barley.		
Name not given	52	48
Winter barley	48	48

The exhibition of horses was good, some very fine stock being on the ground, among which may be mentioned the celebrated stallion Mambrino Turk, and also some fine colts of his get. Also the stallion Forester (Norman Percheron). Both of these horses were exhibited at the State Fair and were awarded first premiums. We are pleased to note that our farmers are paying more attention to the improvement of their stock, and a generous spirit of rivalry has sprung up in that direction which cannot be otherwise than beneficial in its general results.

The display of cattle, swine, and poultry was good, quite a number of Shorthorns of superior quality being among the number. In fact, the Holstein heifer which was awarded the first premium at the State Fair came off second best (in the estimation of the judges) at our county fair.

As shown in my grain report, some excellent qualities of wheat were exhibited and two cases are worthy of mention here, viz.: that Mr. Casper Knight exhibited some White Russian wheat which averaged over 61 bushels to the acre; also another in which 9 acres yielded 47 bushels and 20 lbs per acre.

The display of vegetables was not so good as in former years, owing to the drouth, but still some of those exhibited were of enormous growth, bushels of potatoes averaging over a pound each, a squash weighing one hundred and fifty pounds, a beet weighing 19 pounds, and rutabagas, cabbages, onions, etc., of surprising weight.

The display of fruit was good, although the crop in the county was very limited as compared with other years.

I am gratified to be able to report an increased interest on the part of the farming community in the success of our agricultural society, which augurs well for the same. Although the society does not claim to have been entirely free from blunders, and although more or less grumbling may always be expected, yet we believe we may claim with truthfulness and without fear of contradiction that the last fair of the Bay County Agricultural Society developed less friction and more general satisfaction to all concerned than any previous exhibition in the history of the same.

In accordance with our amended articles of association an election of officers was held at the Secretary's office on the third day of the fair, with the following result:

President—L. L. Culver, Bay City.
Secretary—S. C. Wilson, Bay City.
Treasurer—Wm. Westover, Bay City.
Directors—E. Y. Williams, W. H. Tausey, Chas. Supe, A. McDonell, Bay City; Horace Decker, Arenac; Wm. Gaffney, Monitor; Ira Swartz, Williams; B. F. Partridge, Portsmouth; John Jones, Hampton.

All of which is respectfully submitted.

S. C. WILSON, *Secretary.*

BAY CITY, December 10, 1879.

BERRIEN COUNTY.

In accordance with the laws of the State I herewith present the report of our society for the year 1879.

The 29th annual fair of the Berrien County Agricultural Society was held upon the society's grounds in the city of Niles Sept. 23d, 24th, 25th and 26th. The weather was very favorable, being cold for the time of year, but only part of the second day was disagreeably so. The entries and attendance were less than usual with us, partly on account of the fair being earlier and the farmers being later than usual with their seeding, caused by the dry weather in August preventing plowing from being done at that time. Nevertheless many departments were well filled. The exhibit of cattle, sheep and swine was good, both in quality and quantity. Of farm products and fruit there was a fair show. But the deficiency was very apparent in floral hall and the implement departments, which are expected to be filled mostly by the people of the towns, who have, with a few notable exceptions, failed to encourage the society either by their exhibits or presence, unless they are given some special privilege or a chance to make some money out of it.

But if we have not saved a few hundreds to apply upon the debt, it is a satisfaction to be able to meet all demands, including about $200 for permanent improvements.

The following is a condensed statement of the entries and awards in the regular list. As some premiums were donated to the society, this and the Treasurer's report do not appear to correspond.

	No. of Entries.	Amount Awarded
Horses	80	$143 00
Cattle	35	93 50
Sheep and Swine	63	105 00
Field Crops and Vegetables	116	23 75
Fruit and Flowers	154	37 50
Dairy, Domestic Manufacture, and Needle Work	91	34 80
Implements, Furniture, Merchants' Goods, etc.	59	55 75
Total	598	$493 30

The whole amount of premiums offered in the regular list was $800, and about as much in a special list upon which percentage was charged for entries.

The Treasurer's report is as follows:

RECEIPTS.

From membership tickets sold	$138 00
From gate money and grand stand	800 93
From rent of stands and donations	151 00
From percentage on special premiums	212 50
Total	$1,302 43

DISBURSEMENTS.

Paid lumber and labor for improvements	$200 00
Paid contingent expense	166 26
Paid premiums, regular list	433 30
Paid premiums, special list	455 00
Total	$1,254 56
Balance on hand	47 87
	$1,302 43

The interest upon the indebtedness is to be met by money yet to be received from the county, and is therefore not included in this report.

The officers elected at the annual meeting in November for the ensuing year are as follows:

President—Wm. B. Davis.
Vice President—Chas. F. Howe.
Treasurer—B. F. Fish.
Secretary—S. C. Thomson.
Directors—S. A. Denison, Burns Helmick, Wm. Pears, Jas. Badger, H. A. Edwards, B. Frankenburg, Thos. Mars, Geo. S. Hoppin, John H. Young, and W. W. Harder.

Who have met here to-day to receive this report of the past and to organize for the work of another year.

All of which is respectfully submitted.

S. C. THOMSON, *Secretary.*

NILES, Berrien Co., Jan. 5, 1880.

INGHAM COUNTY.

The annual meeting of the members of the Ingham County Agricultural Society was held at the court-house in Mason on the 15th inst. The meeting was called to order by Vice President D. E. Watts, who presided in absence of the President. Reports were made by the Secretary and Treasurer, which were accepted and adopted. The committee on finances, consisting of D. E. Watts, C. B. Andrews and N. Severance, reported that they had thoroughly examined all the vouchers drawn upon the treasurer for the year 1879 and found them correct, as per reports of Treasurer and Secretary.

TREASURER'S REPORT.

MASON, January 15, 1880.

RECEIPTS.

Received from ex-treasurer	$56 22
" " licenses at fair	114 20
" " entrance fee for races	56 40
" for right to sell refreshments	80 00
" " pasturage	15 00
" " privilege paying off premiums	10 00
" from sale of membership, life membership and small tickets at fair	1,128 75
Total receipts	$1,460 57

EXPENDITURES.

Paid interest on indebtedness	$170 00	
" orders aggregating	1,282 68	
Total expenditures	$1,452 68	
Balance on hand		$7 89

WM. M. WEBB, *Treasurer.*

The Secretary's report was quite lengthy and showed in detail the amount of every order drawn during the year, the purpose for which it was drawn, and the name of the person receiving it. The expenditures abbreviated are as follows:

For printing during the year	$127 00
For improvements and repairs	54 98
For expense of exhibition	138 90
For interest on indebtedness	170 00
For Secretary's salary	80 00
For premiums	881 25
Total	$1,452 68

The fair of 1879, as an exhibition of the various products and industries of Ingham county, was very successful. All the different departments were well represented, and the show of stock of all kinds was never better at any of our former fairs. The whole number of entries made was 2,077, which is 113 more than was made at the fair in 1878. Some $35 in premiums have been by different parties very generously donated to the society, and the balance of $881.25 have been promptly paid in full.

OFFICERS TO BE ELECTED.

It becomes your duty, gentlemen, to elect at this meeting a president, secretary, and treasurer, three vice presidents to fill the vacancies made by the expired terms of Caleb Angevine of Leslie, Nathan Severance of Alaiedon, and D. E. Watts of Ingham; also, two directors for the term of three years in the place of E. H. Angell of Bunkerhill and James Fuller of Vevay, whose terms of office have this day expired. Hoping that the very best men may be chosen for each of these responsible positions, I respectfully submit this as my annual report. GEO. W. BRISTOL, *Secretary.*

The meeting then proceeded to the election of officers for the ensuing year, which resulted as follows:

President—Caleb Angevine of Leslie.
Secretary—John C. Squiers of Mason.
Treasurer—Willis Horton of Vevay.
First Vice President—R. J. Bullen of Aurelius.
Second Vice President—H. J. Haight of Alaiedon.
Third Vice President—D. E. Watts of Ingham.
Directors for three years—Geo. Phelps of Meridian, and E. C. Russell of Vevay.

Geo. W. Bristol, who has filled the office of secretary for 13 years, declined a reëlection.

The following resolutions were unanimously adopted:

WHEREAS, Geo. W. Bristol has so faithfully and efficiently served the Ingham County Agricultural Society during the term of thirteen years, in the capacity of secretary, therefore

Resolved, That we, as the representatives of the society, sincerely regret the circumstances which make it necessary for Mr. Bristol to decline further honor to the society by not retaining the position he has filled so long and with such conspicuous and universal satisfaction;

Resolved, That the earnest thanks of the society are due and are hereby tendered to Mr. Bristol for his untiring and persistent efforts in its behalf, and for the impartial and zealous manner in which he has met and performed the arduous and oftimes perplexing duties of his office;

Resolved, That it is the sense of this meeting that the Ingham County Agricultural Society has gained many warm friends and its interests have been materially advanced by the courteous and gentlemanly conduct, at all times manifest, of its most worthy and time-honored secretary;

Resolved, That a copy of these resolutions be spread upon the records of this society, also furnished for publication with the minutes of this meeting, and that a copy be forwarded to the secretary of the State Board of Agriculture for insertion in his forthcoming report with the doings of this society.

The meeting also adopted the following resolution:

Resolved, That this society exclude from its grounds during the fair all parties operating with games of chance, such as "wheels of fortune," "Modocks," "air guns," games with rings, etc.

The first meeting of the board of managers will be held at the court-house in Mason, on Thursday, the 19th day of February next, at 10 o'clock.

JNO. C. SQUIERS, *Secretary*.

KALAMAZOO COUNTY.

There was a large attendance of prominent farmers of the county at the court-house on Saturday, Jan. 10, in attendance at the annual meeting of the Agricultural Society.

President Cobb called the meeting to order at 1:30 P. M., and announced that the first business would be the report of the Secretary.

Mr. Frank Little, Secretary of the Society, then submitted the following report:

MR. PRESIDENT AND GENTLEMEN,—The year 1879, just closed, has been eminently a successful one in all branches of business in our State. Especially is this true in the field of agriculture, a branch of popular industry our society is expressly organized to promote.

The wheat crop of Michigan for 1879 stands unparalleled, both in the superior quality of the grain, but particularly in reference to the unprecedented yield above an average crop.

Good and careful observers estimate the average yield in this county the past year to have been fully 25 bushels per acre, an increase of at least six bushels per acre over any former year. While climatic influences during the growing season of any crop largely control results, yet it is also a gratifying fact to note that our farmers are paying more attention to the whole subject of systematic and improved methods of grain raising and other braches of farm industry. New varieties of seed and more thorough tillage have largely contributed to the success above noted.

The corn crop of the county for the past year is below the average in yield, the result clearly of a pinching drought that prevailed at earing time. No epidemic, to any extent, has prevailed among farm animals, and prices generally have been remunerative, and well sustained. In connection with the general progress so clearly discernable, special mention should be made of the great improvements that have been made within the past few years in all classes of implements and machinery used in the various operations of the farm. These have tended largely to elevate the profession, so called; to make farm life more attractive. Our farmers are relieved immensely from the overtasking drudgery of hand labor; the young men are less inclined to desert the farm for more congenial or less laborious pursuits, and the functions and capacities, the powers and forces requisite in carrying on the yearly work of the farm have been increased enormously by these inventions and labor-saving appliances.

We are pleased to chronicle another year's successful work of our agricultural society. That it is growing in importance and usefulness is undeniable, and is attested to by all candid observers. Our annual fairs are fast becoming model exhibitions, and are made the subject of high commendation on the part of visiting strangers, and intelligent, disinterested spectators. I may be pardoned in saying in behalf of the management, that the officers of the society, unitedly as one man, have labored zealously to further its interests in every laudable direction; and we are pleased to know that the people of the county appreciate what is being done for them by thesegentlemen who stand at the head of the various departments of the fair, and that their voluntary, unremunerated efforts in the direction indicated, are so well sustained and seconded by the farmers, business men, mechanics, and citizens of the county.

The business transactions of the society for the year 1879 are here summarized as follows:

EXHIBITORS.

Whole number of exhibitors at the fair of 1879	298

ENTRIES.

Whole number enties 1879	1,371

SUBDIVISION OF ENTRIES.

Horses	149	
Cattle	78	
Sheep	56	
Swine	33	
Poultry	41	
		357
Grain, vegetables, fruits and flowers		511
Dairy, household and domestic		195
Fancy articles, paintings, merchandise, etc.		204
Iron work, carriages, implements, etc.		104

PREMIUMS AWARDED.

Horses—general and special	$596 00	
Cattle	169 00	
Sheep	81 00	
Swine	66 00	
Poultry	33 25	
		$945 25
Grain, vegetables, fruit and flowers	196 50	
Dairy, household and domestic manufactures	80 75	
Fancy work, paintings and merchandise	123 75	
Iron work, carriages, implements, etc.	80 50	
		481 50
Total		$1,426 75

RECEIPTS FOR 1879.

Ad's in pamphlet (excess)	$25 00	
Rent of stands on the ground	148 75	
Citizens' subscription	159 00	
Entrance fees, special classes	182 00	
Memberships	298 00	
Gate tickets	1,522 20	
Grand stand	129 50	
		$2,464 45

EXPENDITURES.

Premium checks fair 1879	$1,421 25	
Rent National Park	300 00	
Labor, watch, gate-keeper, etc.	186 25	
Lumber, nails, glass, etc.	77 14	
Hay and straw	179 37	
Music and wagon	68 00	
Postage, stationery, ribbons, etc.	55 00	
All other contingent	360 60	
Total		$2,647 62

FINANCES.

Debtor.		
Cash on hand January 11, 1879	$141 04	
Intrest on Pierce mortgage for 1879	108 00	
Receipts from all other sources, 1879	2,468 45	
		$2,713 49
Creditor.		
Paid-checks drawn upon treasury, 1879	$2,647 62	
Cash on hand January 10, 1880	65 87	
		$2,713 49

SUB-STATEMENT.

Treasury debtor, January 10, 1880.

Cash on hand	$65 87	
Pierce note and mortgage due April 6, 1880	1,350 00	
Interest due on above April 6, 1880	108 00	
Total assets		$1,523 87

Of the acre crops entered at the fair, only one statement has been filed in accordance with the rules of the society which is herewith submitted:

STATEMENT OF AN ACRE OF CORN RAISED BY W. P. HOPE.

The soil is sandy loam. The state of the soil was June grass sod.

Cost of plowing to same	$1 00
Harrowing the same	50
Marking the same	15
Planting	35
Manure used, gypsum, one peck to the acre, applied on the hill	5
Applying the gypsum	25
Cost of working the corn	1 00

The above acre was gone twice through, twice in each row. Husking was done November 10, 1879.

Cost of husking the above at 2½ cents per bushel	2 35
Total cost of raising one acre of corn	$5 65

The product of the above acre was one hundred and four bushels of ears (104), equivalent to sixty-nine and one-third bushels of shelled corn.

I believe I have made the above statement according to the requirements of the society.

WM. P. HOPE.

I know the above statement to be correct.

JOHN LEWIS.

I would recommend that the first prize for best acre of corn be awarded to Mr. Hope.

Through an error in the report of the viewing committee in class No. 8, sweepstake purse for best stallion for general use, 5 years old and over, the first prize, which was awarded to Mr. John P. Campbell, was marked opposite the entry of Mr. John A. Kendall. Such mistakes on the part of committees, of no uncommon occurrence, are deeply to be regretted; not only for the injustice done exhibitors, but the difficulties that are encountered in attempting to adjust the same satisfactorily after the close of the fair, and the committee have dispersed. Executive superintendents should review the work of their respective committees in this respect with great care, before the books are returned to the office.

We experience more or less difficulty each year in securing the full and prompt attendance of efficient viewing committees. The selections are made in the early spring, of representative men and women of the county, chosen with special reference to their supposed fitness and willingness to serve in the various positions assigned. Now, if your very capable and esteemed president, treasurer, and the various executive superintendents can devote three or four weeks of their time each year gratuitously, in behalf of the agricultural society and its management, it would seem that the class of gentlemen and ladies whose names appear in the annual premium list ought to esteem it an honor, yea more, a high privilege and duty, to serve the society *one day* without expectation of, or the acceptance of any reward for such service, either direct or indirect.

With the exception of editors, reporters, officers of kindred societies, and invited guests from abroad, personally I have long favored the abolishment of the free list at our county fairs. The admission fee is small, only 25 cents, and I believe that there should be in an organization of this kind, working solely to advance the public interests of the locality, no privileged class; but, on the contrary, *all* should be placed upon a perfect equality before the gates.

Special mention should be made of the superior exhibition of cattle, thoroughbred and grades, at our late fair. We believe the animals on exhibition have been scarcely excelled at any fair in the State.

Kalamazoo county is rapidly coming to the front in respect to improving the breed of cattle; and the Agricultural Society has been a valuable auxiliary in arousing a spirit of emulation among our stock-breeders.

The exhibition of grain, vegetables, fruits, dairy and household products in the hall devoted to that purpose, elicited universal commendation of all who visited the fair. It was simply magnificent throughout. A prominent agriculturist and wife from Kansas, who were at the grounds on Thursday, remarked that they were perfectly amazed at the grandeur and excellence of the display; that they had attended various State exhibitions in the west, but they never saw an exhibit in this department excelled.

At the winter meeting of the State Agricultural Society at Detroit one year ago, President Webber congratulated the society upon the fact that since the abolition of horse-racing they had held three of the most successful fairs of the society. President Webber then adds: "If it (the society) cannot be supported (only) upon the basis of speed trials, the general good would be promoted by its ceasing to exist."

Our system of trials of speed, being restricted to county horses, is less objectionable in my opinion than lists "open to the world." Still, waiving all questions as to the fairness or unfairness of these tests, as to whether any considerable number of people are attracted to the fair-grounds simply and solely *to see the horses go*, ought we to offer prizes, much larger in proportion than in any other department, for a class of horses possessing no other known earthly merit save the mere quality of speed upon the race-track, and that no intelligent breeder would ever desire to propagate or perpetuate?

While race horses are the capital stock of pool sellers and gamblers, the farmer has but little use for them. Unquestionably the society should lend its influence and encourage the breeding of solid business horses, adapted to the heavy work of the farm and transportation of crops to market.

At a late meeting of the State Teachers' Association, Prof. George E. Cochrane, Superintendent of the Kalamazoo public schools, read a paper which was well received, entitled "The exhibition of school material at county and other fairs, as a means of promoting education." The suggestion is eminently a practical one, and ample facilitiee can readily be afforded for such a department if thought advisable.

THE PROPOSED FAIR GROUND PURCHASE.

The subject of procuring suitable grounds for the society whereon to hold its annual fairs, recurs again at this meeting of the association with pressing significance. We cannot reasonably defer action upon a matter of such vital concern to the life and usefulness of the society. I am pleased to announce that we are now in condition to submit this question fairly and openly to the people of the county, for a clear expression of their views at the ballot box, whether they take any interest whatever in the society; whether, as a time-honored institution of the county, whose single aim and purpose is to promote and encourage all branches of public industry, and especially in the direction of agricultural science and development, they desire its maintenance; whether, as a matter of local pride, in view of what has already been achieved through its instrumentality, the reputation it has already gained abroad and the possibilities of good its future may confer, they would regret its downfall and dismemberment; and whether they, the citizens of Kalamazoo county, are willing to vote the necessary aid by which, and only by which, fair grounds can be secured and paid for.

I am safe in the assertion that nearly every other organization of like character in the State has and is receiving aid from the public funds. You are taxed heavily to support the Agricultural College, an institution in which we all take great pride; to erect a State house costing $1,500,000, the envy of all our sister States of the northwest; to maintain public schools, to open up public thoroughfares, and in a multitude of ways, by tax, voluntary subscription or otherwise, paying large sums of money for the support of various institutions of a public character, and will you say that you cannot afford to contribute the small amount asked for in aid of the organization so closely identified with the business in which you are all chiefly engaged, whose benefits are shared by all, and the endowment and building up of which shall be a credit to the county, and be transmitted as a rich legacy to your posterity.

At the last session of our State Legislature the following bill was enacted and became a law:

AN ACT to authorize the county of Kalamazoo to raise money by taxation to buy and improve ground for agricultural fair purposes.

SECTION 1. *The People of the State of Michigan enact:* That it shall be lawful for the qualified voters, who are tax-payers in the county of Kalamazoo, to vote for and raise by tax a sum of money not exceeding twelve thousand dollars, to be used by the proper officers of the Kalamazoo County

Agricultural Society in the purchase and improvement of grounds in the county of Kalamazoo for agricultural fair purposes.

SEC. 2. It shall be the duty of the several township clerks of the county of Kalamazoo, at the written request of the President, Secretary, and Treasurer of the Kalamazoo County Agricultural Society, to give notice by a written or posted notice by posting the same in five public places in each of the several townships of the county of Kalamazoo, at least five days before the annual township meeting, of the intention to vote by ballot on the question of raising by tax the sum of twelve thousand dollars for the purpose named in the first section of this act.

SEC. 3. At any annual township meeting after the passage of this act, the qualified voters who are tax-payers in the county of Kalamazoo, may vote by ballot on the question hereinbefore named, those voting in favor of raising by tax the sum aforesaid, having on their ballots the words, "For purchasing county fair grounds—Yes," and those voting against raising such tax, having on their ballots the words, "For purchasing county fair grounds—No," and the ballots so cast shall be canvassed by the proper canvassing officers of the several townships, and returns made to the office of the county clerk of the county of Kalamazoo, as returns are required to be made of township officers elected at the annual township meetings in the State of Michigan: *Provided*, That no person shall be allowed to vote upon such proposition unless his name appears on the assessment roll of the township or ward in which he offers to vote, for the current year, or unless he files with the inspectors of election an affidavit that he is then the owner of real estate in such township or ward liable to be taxed, and that such real estate was purchased by him *bona fide* and not for the purpose of voting at such election.

SEC. 4. At an election held as prescribed in the foregoing sections of this act, if a majority of the qualified voters who are tax-payers in the county of Kalamazoo, voting on said proposition to raise by tax the sum of twelve thousand dollars, shall vote "Yes," then said sum shall be spread upon the rolls, in the several townships of the county of Kalamazoo, in proper proportions as other county taxes are assessed.

SEC. 5. Said sum of twelve thousand dollars shall be paid when collected into the hands of the county treasurer, and by him paid to the treasurer of the Kalamazoo County Agricultural Society, upon the order of the president and secretary of said society, they certifying in said order that said sum is required for the purchase of grounds as provided for in this act, on a contract then made

Grave doubts have been entertained by the friends of the society as to whether a majority of the citizen tax-payers in the respective towns of the county would support the measure and vote the tax. As an earnest of the single and candid wish on the part of the present board of officers to divest the question of all possible personal considerations that the people of the county should have an unquestioned guarantee of safety in the investment and that the result of the ballot shall be a clear, unalloyed expression of the sentiment of the people as to whether they desire the maintenance of the society or not, the following communication was placed before the board of supervisors of the county at the meeting of that body in October last, which was by them referred to a special committee consisting of Messrs. Hoyt, of Kalamazoo, chairman, and Lovell, of Climax, and Douglass, of Schoolcraft, associates on the committee.

To the Honorable, the Board of Supervisors of Kalamazoo county:

The undersigned would respectfully represent that, at the last session of the Michigan State Legislature, an act was passed (a copy of which is hereunto annexed) authorizing "the qualified voters who are taxpayers of the county of Kalamazoo, to raise by tax the sum of twelve thousand dollars for the purchase and improvement of grounds in the county of Kalamazoo for agricultural fair purposes."

It is essential to the permanent welfare of the agricultural society that it be placed upon a more substantial basis than it now occupies. This can only be secured by the purchase of suitable grounds whereon to hold its annual fairs. To accomplish this object, the law as above stated was passed, enabling the people of the county to provide the necessary means by uniform tax. That the question may be submitted to the people in as favorable a light as possible, we deem it important that it shall in some way receive the sanction and endorsement of your honorable body. An influential portion of the public in the several towns may object to making an appropriation exclusively for the agricultural society: 1st, because they may believe that such associations have no claim, and are of no appreciable public benefit; 2d, that if grounds are purchased, fitted up, and held exclusively for fair purposes, that otherwise they must remain comparatively idle a large portion of the year. It is the sincere wish of the agricultural society to win popular approval, and to remove all objections to the proposed tax so far as may be. We, therefore, having in view solely the public interests and an economical administration of public affairs, would respectfully request your honorable body to take under careful consideration the subject of purchasing grounds at the county seat, *to be the property of the county*, that shall be adequate, and to be used for the purpose of holding agricultural fairs, and, also, for any and such other purposes, not incompatible with the foregoing, as the public needs of the county may from time to time require, under the direction and control of Kalamazoo county. To the end that the suggestions herein embodied may receive due attention, we would respectfully request a special reference of this subject to a select committee of your honorable body, to report at the regular meeting of your board in January next, so that, if so determined, a joint submission of such questions as may be deemed advisable and in conformity with the statutes may be had at the next annual township elections to be held in this county. Very respectfully submitted,

FRANK LITTLE, *Sec'y Kal. Ag'l Soc.*

KALAMAZOO, MICH., Oct. 17, 1879.

The proportion each would pay of the sum of $12,000, would be 66⅔ cents on $1,000 valuation.

It is the present purpose to submit the question to the people at the coming spring election.

The State association of agricultural societies of Michigan will hold its seventh annual convention at Ann Arbor, commencing Tuesday evening, Jan. 20. This is an important organization, and delegates should be chosen by this society to attend the meeting. I would recommend that the business committee of last year be authorized to represent, or secure delegates to said convention.

In conclusion, we have every reason for sincere congratulations on the part of the friends and patrons of our association in view of the successes attending our exhibitions for the past few years. We have now, upon general principles, in my opinion, a county organization second to none other in the State in point of usefulness and efficiency. This has only been attained by persistent, laborious, and systematic effort. There has been no attempt to reach after ephemeral or sensational distinction. We have aimed to build upon a solid foundation, such as the public sense of the community would endorse, and it is gratifying to know that our growth thus far has been steady and substantial.

Much credit is due your worthy President, Mr. Cobb, and the other efficient officers composing the executive board, for the faithful manner in which they have discharged the arduous duties assigned them for so many years, and that without any compensation, except the well-earned thanks of an appreciative community.

Respectfully submitted. FRANK LITTLE,
Secretary Kalamazoo Co. Agricultural Society.

KALAMAZOO, MICH., Jan. 10, 1880.

The report was unanimously accepted and adopted.

ELECTION OF OFFICERS.

J. D. Adams moved that the meeting adjourn because the wives of members were not present. This motion was lost. The meeting then proceeded to the election of officers. Mr. W. H. Cobb peremptorily refused to serve any longer as president. The following is the result of the first ballot: W. L. Curtis 13, Cobb 14, Humphrey 2, Morrison 6, Snow 3, Blair 2, Kirby 1; total 41.

A second ballot was then taken with the following result: Wm. L. Curtis 31, W. H. Cobb 1, C. E. Morrison 7, W. G. Kirby 1, J. B. Cobb 1. On motion Mr. Curtis was declared unanimously elected.

The convention then proceeded to ballot for Secretary and Frank Little was unanimously elected.

James B. Cobb was elected Treasurer.

A committee of five was appointed to nominate an Executive Committee. They reported the following, who were unanimously elected: C. E. Morrison, B. Vosburg, Orrin Snow, W. Judson.

NORTHERN MICHIGAN AGRICULTURAL SOCIETY.

A preliminary meeting for the organization of an agricultural society at Greenville was held here the last of August, 1877. Committees were appointed, etc., and at a subsequent meeting articles of association were subscribed to, a premium list was adopted, and the following officers elected for the ensuing year: R. C. Miller president, Walter Whitfield vice president, Wm. Backus treasurer, and James Satterlee secretary.

The first annual fair was held on the 2d, 3d and 4th of October. The number of entries was thirteen hundred and the total receipts were $1,566.50. The expenses were $1,436.71, leaving a balance of $129.79.

At the second annual meeting, held on the first Saturday of January, 1878, the same officers were reëlected.

The second annual fair was held on the first four days of October, 1878.

The number of entries was fifteen hundred and sixty. The total receipts were $2,304.64. The expenses were $2,135.27; leaving a balance on hand for the year of $169.37.

At the annual meeting in January, 1879, H. B. Fargo was elected president, Walter Whitfield vice president, C. J. Church treasurer, and James Satterlee secretary. It was voted to place the society on a more permanent basis by organizing under the statute. Accordingly the necessary notice was given and at the meeting called on the last Saturday of February new articles of association were adopted, the same officers reëlected, a board of eight directors chosen and the society organized under Act 125 of Session Laws of 1871. The society includes the territory comprised by the counties of Montcalm, Ionia, Kent, Gratiot, Isabella and Mecosta.

The third annual fair was held at Greenville on the 30th of September and the 1st, 2d and 3d of October, 1879. The number of entries was seventeen hundred and eighty. The total receipts were $2,748.59. The expenses were $2,539.24; leaving a balance for the year of $209.35, and a total balance for the three years of $508.51.

We feel greatly encouraged at the success of the society thus far. The exhibitions have been of high order of merit, and the interest taken by all shows well for the enterprise of the people of Montcalm and surrounding counties.

The society hopes to make arrangements for the purchase of the grounds of the Greenville Driving Park Association, on which our fairs are annually held. They are conveniently located and very pleasant, and the track is one of the best in northern Michigan.

JAMES SATTERLEE, *Secretary.*

Dated Greenville, December 1st, 1879.

SAGINAW COUNTY.

The corn crop for 1879 was very good, although somewhat injured by the worm. Our hay crop was light. Our wheat crop was good, and better than our average; I think Saginaw county averaged 25 bushels per acre. Potatoes were scarcely a medium crop, having been injured by the dry weather of July and August. The oat and buckwheat crops were also light from the same cause.

The exhibition of stock at our last fair, as regards quality, was never excelled in this county. The exhibition of Short-horns was exceedingly fine, which I must say is one of the best signs that Saginaw is going ahead. We had a splendid herd of Holsteins, which fact speaks well for the enterprise of our people. The Jerseys were well represented. We had a very good show of draught and carriage horses. Sheep—we cannot say a great deal about this most profitable animal; our county is very new, and the danger from dogs has been very great; though as the forests get cleared they will be introduced more, for there is no question about there being profit in sheep. Swine—the exhibition of Poland-Chinas, Berkshires and Essex was very good. Much credit is due to our breeders for the improvement they have made in this class.

Poultry—I think there are few counties in the State that can beat Saginaw in poultry. We had nearly one hundred coops on exhibition of very choice birds.

The total number of entries at our fair was one thousand five hundred.

OFFICERS FOR 1880.

President—John Welch, East Saginaw.
Secretary—Thos. W. Newrick, Saginaw City.
Treasurer—William A. Arnold, East Saginaw.
Executive Committee—(for two years) Miles N. Rouse, East Saginaw; Robert Ure, Saginaw City; John Fischer, Saginaw City; (or one year) James Graham, Saginaw City; George F. Gould, East Saginaw; Ruben Beman, Saginaw City.

THOS. W. NEWRICK, *Sec'y.*

SAGINAW COUNTY FARMERS' CLUB.

This club, organized Feb., 1878, with a membership of 23, has increased its numbers to 47.

The object of the association is to bring together farmers for the mutual discussion of agricultural subjects and kindred questions.

The club meets regularly every third Saturday in each month. The officers of the club are a president, secretary, treasurer, and twelve executive committee.

Questions are selected by the committee for each meeting, and some one appointed to read an essay on the subject before the meeting, after which the question is opened for discussion to all the members who desire to take part.

These discussions are social and informal, yet they bring out a great deal of practical and valuable information in regard to agricultural pursuits which could hardly be gained in any other way.

According to the report of the members of this club, there has been a much larger breadth of wheat sown in the fall of '79 than at any other time in this county, and the appearance of the young plant so far never looked better than now (Feb. 1st, 1880). There were 426,360 bushels of wheat harvested in Saginaw county in 1879, full 67,470 bushels more than was raised the year before; and the crop for 1880 promises full 500,000 bushels, provided the weather and harvest are favorable.

STOCKBRIDGE UNION SOCIETY.

The Stockbridge Union Agricultural Society make the following report for the year 1879:

Amount on hand Dec. 4, 1878	$734 48
Amount of premiums for 1878, paid	95 25
Amount of improvements during the year	540 00
Expense of the fair of 1879	100 00
Receipts of the fair of 1879	1,750 00

Orders paid to date	$247 35
Paid rent on grounds	100 00
Amount on hand Dec. 4, 1879 (about)	1,400 00
Orders not yet paid (about)	215 00
Number of entries	1,300

WM. M. STEPHENS, *President.*
S. P. REYNOLDS, *Secretary.*
JOHN FARMER, *Treasurer.*

VAN BUREN COUNTY.

The annual meeting of the Van Buren County Agricultural Society was held at the court-house in Paw Paw on Tuesday, January 6, at 1 o'clock P. M.

The meeting was called to order by the President, David Woodman, who stated that this was the regular annual meeting of the society, called in accordance with the by-laws, for the purpose of submitting reports of last year's business, the election of officers for the ensuing year, and the consideration of such other business as might properly be brought before the meeting.

The Treasurer, N. M. Pusley, submitted his report, as follows:

RECEIPTS.

Cash on hand from 1878	$13 43
Admission tickets 1879	1,321 30
Grand stand tickets	34 23
Dining hall, booths, etc.	180 88
Life membership certificates	55 00
Other sources	45 00
Total receipts	$1,649 84

DISBURSEMENTS.

Paid interest on indebtedness	$235 00	
" speaker	100 00	
Band and band wagon	41 00	
Printing	83 93	
Hay and straw	64 54	
Lumber	38 54	
Dinners for committees	62 75	
Labor before and during the fair	109 37	
Hardware, paint, glass, etc.	23 95	
Premiums	581 10	
Total disbursements		$1,340 20
Balance on hand		$309 64

The report of the treasurer was accepted and adopted.

The Secretary submitted his report as follows:

As many inquiries have been made during the past few months as to the success of the last fair, and also as to receipts and expenses of the society since the present ground was bought and occupied in 1870, I have prepared a report which deals almost entirely in figures.

The following are the receipts and expenses since 1870:

1870—Receipts (including $340 from county and $207 from life members)		$1,627 93
Expenses		1,643 48
1871—Receipts		1,180 35
Expenses		1,198 82
1872—Receipts (including $250 from county and $113 from life members)		1,629 30
Expenses		1,486 15
1873—Receipts (including $200 from life members)		1,524 65
Expenses		1,664 54
1874—Receipts (including $168.75 from county)		1,670 75
Expenses		1,899 14
1875—Receipts (including $133.33 from county)		1,589 77
Expenses		1,596 72
1876—Receipts (including $133.33 from county)		1,238 02
Expenses		1,235 36
1877—Receipts (including $100 from county)		1,636 22
Expenses		1,687 66
1878—Receipts		2,505 49
Expenses (including interest on indebtedness)		2,138 21
1879—Receipts		1,649 84
Expenses (including interest on indebtedness)		1,340 20
Indebtedness of the society October 10, 1878—		
Mortgage on grounds		$1,500 00
Notes		1,655 00
Interest on same		300 50
Total		$3,455 50
Indebtedness January 6, 1880—		
Mortgage	$1,500 00	
Notes	1,115 00	
		2,615 00
Reduction		$840 50

The following table shows the number of exhibitors and entries since 1874 in classes named:

	1874.	1875.	1876.	1877.	1878.	1879.
Exhibitors	353	429	400	377	434	380
Horses	128	152	166	152	231	213
Cattle	52	50	47	33	82	49
Sheep	52	49	57	51	59	47
Swine	18	16	41	54	57	48
Poultry	9	16	31	18	19	37
Total	259	283	342	308	448	394

On motion the report of the Secretary was accepted and adopted.

The next order of business being the election of officers, the President appointed J. W. Free and N. H. Bangs tellers. The election resulted as follows:

President—David Woodman.
Vice President—Joseph Kilburn.
Secretary—C. A. Harrison.
Treasurer—N. M. Pugsley.
Directors—O. P. Morton, E. P. Mills, J. T. Bangs, Aaron Van Auken, C. W. Young and F. W. Valieau.

PAW PAW, January 8, 1880.

WESTERN MICHIGAN AGRICULTURAL AND INDUSTRIAL SOCIETY.

"The Western Michigan Agricultural and Industrial Society" was organized at Grand Rapids, May 28th, 1879. Said Society leased the grounds of the Kent County Agricultural Society for five years, intending to hold fairs annually thereon.

Immediately succeeding the organization of the Western Michigan Agricultural and Industrial Society, the merchants and business men of the city of Grand Rapids, subscribed and paid the sum of four thousand dollars and some over, for the purpose of enabling the new society to erect suitable buildings, and fit the grounds for holding a first-class exposition.

The Society held its first fair September 22 to 27, 1879, which was a decided success.

The number of entries in Section A, Horses, was one hundred and eighty. In Section B, Cattle, one hundred and eighty-two entries. In Section C, Sheep, seventy-nine entries. In Section D, Swine, seventy-nine entries. In Section E, Poultry, one hundred and twenty-nine entries. In Section F, Farm and Garden Products, three hundred and fifty entries. In Section G, Fruits and Flowers, one thousand two hundred and eight entries. In Section J, Farm Implements, one hundred and seventy-one entries. In Section K, Vehicles, thirty-eight entries. In Section L, Machinery, ninety entries. In Section M, Manufactured Goods, one hundred and sixty-nine entries. In Section N, Art and Science, thirty-one entries. In Section O, Paintings and Needlework, four hundred and sixty-six entries. In Youths' Department, sixty-four entries. Making a total of three thousand two hundred and thirty-six entries.

The following is a summary of the Treasurer's Report:

Amount received from Business Committes on account of subscription of citizens of Grand Rapids	$4,027 50
Receipts from speed entries	836 25
" " sale of Admission tickets	9,193 10
" " membership certificates	480 00
" " herd entries	81 50
" " sale of hay	30 43
" " Booth rents	1,928 50
" " purse found and left with Treasurer	1 16
" " premium donated by M. L. Sweet	33 00
	$16,611 44

DISBURSEMENTS.

Amount paid bills of Business Committee on account of construction, etc.	$4,765 52
" paid on account of premiums and general fair expenses	8,871 07
" cash in Treasurer's hands	2,974 85
	$16,611 44

The society held its first annual meeting at Sweet's Hotel, Grand Rapids, January 20, 1880, and completed the business of the past year, in a manner satisfactory to all persons having unsettled business, and then adjourned.

In the afternoon of the same day a meeting was held at the same place for the purpose of electing five directors to serve for the term of three years.

The five directors whose term of office expired with the first year of the society were re-elected for three years.

The Board of Directors is composed of fifteen members, who have the power to elect President, Treasurer, Secretary, and Corresponding Secretary.

The Board of Directors re-elected the officers whose terms had expired.

The following compose the Board for 1880:

President—Geo. W. Thayer, Grand Rapids.
Treasurer—E. B. Dikeman, Grand Rapids.
Secretary—James Cox, Grand Rapids.
Corresponding Secretary—J. P. Thompson, Detroit.
Directors for one year—Alvin Chapman, Bangor; F. J. Russell, Hart; H. Dale Adams, Galesburg; C. L. Whitney, Muskegon; David Woodman, Paw Paw.
Directors for two years—Samuel L. Fuller, Grand Rapids; H. C. Sherwood, Watervliet; D. A. Blodgett, Hersey; Abraham Alderman, Orleans; Abraham Ryerson, Hastings.
Directors for three years—John H. Withey, Cascade; William Ladner, Big Rapids; Anderson Stout, St. Johns; Westbrook Divine, Belding; J. G. Ramsdell, Traverse City.

The Board of Directors thoroughly revised the premium list, and added many new and attractive premiums thereto. The by-laws also were amended, and additions made to the same.

After consultation and deliberation, and having made all possible arrangements for a large and successful exposition for the coming year, the Board of Directors adjourned, subject to the call of the President.

The executive board of the Kent County Agricultural Society having leased the fair grounds to the Western Michigan Agricultural and Industrial Society, said Kent County Society held no fair the past year.

REGISTER OF

METEOROLOGICAL OBSERVATIONS

FOR THE YEAR 1879,

TAKEN AT THE

State Agricultural College of Michigan,

BY R. C. KEDZIE,

PROFESSOR OF CHEMISTRY.

LATITUDE 42° 43′ 56″; LONGITUDE 7° 25′ 59″ WEST OF WASHINGTON

Height above the Sea, 834 feet.

METEOROLOGICAL OBSERVATIONS FOR

DAY OF MONTH.	THERMOMETER, IN OPEN AIR.				PRESSURE OF VAPOR, IN INCHES.			RELATIVE HUMIDITY, OR PERCENTAGE OF SATURATION.			BAROMETER, REDUCED TO FREEZING POINT.			
	7 A. M.	2 P. M.	9 P. M.	Daily Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.
1	3	26	19	16	.050	.105	.103	100	75	100	29.150	29.126	29.098	29.125
2	-1	3	-14	-4	.042	.030	.024	100	100	100	29.111	29.116	29.102	29.110
3	-16	8	6	-⅔	.022	.018	.057	100	77	100	29.138	29.136	29.200	29.158
4	7	14	5	8⅔	.060	.082	.055	100	100	100	29.268	29.229	29.219	29.239
5	9	18	13	13⅓	.065	.067	.078	100	68	100	29.235	29.318	29.276	29.276
6	19	22	10	17	.071	.101	.068	69	86	100	29.287	29.259	29.207	29.251
7	12	19	19	16⅔	.060	.087	.103	80	84	100	29.170	29.057	29.027	29.085
8	22	22	14	19⅓	.101	.101	.082	86	86	100	28.996	28.976	29.031	29.001
9	5	16	15	12	.055	.074	.055	100	83	64	29.001	28.941	29.098	29.013
10	8	15	13	12	.062	.070	.048	100	82	62	29.270	29.296	29.335	29.300
11	14	22	1	12⅓	.082	.084	.046	100	71	100	29.338	29.259	29.291	29.296
12	-6	19	10	7⅔	.033	.103	.068	100	100	100	29.245	29.191	29.097	29.178
13	19	28	22	23	.087	.117	.101	84	76	86	29.014	29.008	29.008	29.010
14	23	28	26	25⅔	.123	.135	.123	100	88	87	29.133	29.168	29.285	29.195
15	16	18	15	16⅓	.090	.082	.086	100	84	100	29.384	29.218	28.867	29.156
16	18	29	12	19⅔	.098	.123	.075	100	77	100	28.855	29.115	29.248	29.073
17	20	27	30	25⅔	.108	.129	.130	100	88	78	29.167	28.977	28.833	28.992
18	18	25	16	19⅔	.098	.100	.090	100	74	100	29.055	29.043	29.092	29.063
19	15	19	2	12	.086	.103	.048	100	100	100	29.155	29.193	29.156	29.168
20	4	13	11	9⅓	.052	.063	.071	100	81	100	29.013	28.961	29.028	29.001
21	15	25	32	24	.086	.117	.143	100	87	79	28.903	28.617	28.681	28.734
22	21	34	26	27	.113	.155	.123	100	79	87	28.869	28.787	28.878	28.845
23	19	32	22	24⅓	.103	.106	.118	100	58	100	29.277	29.304	29.323	29.301
24	25	35	36	32	.117	.142	.149	87	70	71	29.101	28.881	28.897	28.960
25	32	40	12	28	.143	.160	.075	79	64	100	28.950	29.341	29.493	29.261
26	15	27	31	24⅓	.086	.111	.174	100	75	100	29.481	29.281	28.997	29.253
27	44	43	36	41	.289	.278	.212	100	100	100	28.802	28.781	28.839	28.807
28	32	36	26	31⅓	.143	.115	.123	79	51	87	29.138	29.243	29.342	29.241
29	14	36	29	26⅓	.082	.129	.123	100	61	77	29.497	29.414	29.343	29.418
30	22	37	26	28⅓	.118	.136	.123	100	62	87	29.381	29.351	29.288	29.340
31	26	32	22	26⅔	.123	.143	.101	87	79	86	29.172	29.172	29.167	29.170
Sums.	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	-------
Means	------	------	------	19°.19	.092	.110	.096	96	80	92	--------	--------	--------	29.130
Average						.099			89					

THE MONTH OF JANUARY, 1879.

CLOUDS.						WIND.						OZONE.		REGISTERING THERMOM'R.		RAIN AND SNOW.			
7 A. M.		2 P. M.		9 P. M.		7 A. M.		2 P. M.		9 P. M.									
Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Direction.	Force.	Direction.	Force.	Direction.	Force.	Day: 7 A. M. to 2 P. M.	Night: 9 P. M. to 7 A. M.	Maximum.	Minimum.	Beginning Rain or Snow.	Ending Rain or Snow.	Inches of Rain and Melt'd Snow.	Depth of Snow.
00	--------	30	Cu.	100	Nim.	----	0	S W	1	S W	5	7	6	26	–3	8 P. M.	-----	----	---
90	Cu.	100	St.	00	--------	S W	8	S W	18	S W	6	5	3	5	–18	------	7 P.M.	.10	1
00	--------	90	Cu.	90	Cir. Cu.	S W	1	S W	9	S W	16	3	4	7	4	------	-----	----	---
100	St.	30	Cu.	100	Nim.	S W	12	S W	14	S W	5	4	6	14	4	9 P. M.	-----	----	---
100	Nim.	100	Nim.	100	St.	----	0	S W	1	S W	1	5	5	19	9	------	3 P.M.	.10	1½
100	St.	100	St.	100	St.	S W	4	S W	6	S W	4	6	6	22	7	------	-----	----	---
90	Cir. St.	100	St.	100	St.	S W	10	S W	8	S W	10	4	5	22	12	Snow Sq'lls.	-----	----	---
100	Nim.	100	Nim.	100	Cu.	S W	8	W	6	W	8	5	4	27	2	Snow Sq'lls.	-----	----	---
00	--------	100	Cu. St.	100	Cu. St.	----	0	S W	5	S W	4	3	4	13	2	------	-----	----	---
100	Cu. St.	10	St.	100	St.	----	0	S W	4	S W	4	3	4	14	2	------	-----	----	---
100	St.	80	St.	00	--------	----	0	W	1	----	0	3	3	24	–9	------	-----	----	---
90	Cir. Cu.	00	--------	00	--------	----	0	----	0	----	0	3	5	21	9	------	-----	----	---
100	St.	100	St.	100	St.	S W	4	S W	4	----	0	4	4	28	19	------	-----	----	---
100	St.	100	St.	100	St.	----	0	S W	2	N W	1	3	5	29	16	------	-----	----	---
100	St.	100	St.	100	Nim.	N E	2	E	4	E	4	5	6	19	14	2:30 P. M.	-----	----	---
100	Nim.	10	Cu.	00	--------	N W	2	N W	6	----	0	3	4	29	11	-- ---	10 A. M.	.27	4in
100	St.	100	Cir. St.	100	Nim.	S	1	S	6	W	6		5	30	15	------	-----	----	---
00	--------	60	--------	100	St.	S W	2	S W	10	----	..	4	4	29	11	------	-----	----	---
100	Cu. St.	30	Cu.	00	--------	----	--	----	--	----	0	4	5	20	0	------	-----	----	---
100	Nim.	100	Cir. St.	100	Nim.	----	0	----	0	S W	6	5	5	15	4	Snow Sq'lls.	-----	.02	¼
100	Cu. St.	60	Cir.	100	Cu. St.	S W	3	S W	12	W	6	4	4	32	18	------	-----	----	---
100	Cir. Cu.	100	St.	100	St.	----	0	S E	4	N E	4	4	5	36	19	------	-----	----	---
100	Cu. St.	00	--------	100	Cir. St.	W	2	S W	4	----	0	4	5	32	19	------	-----	----	---
100	Cir. St.	70	Cir. St.	30	Cir. St.	S W	10	S W	12	S W	4	4	3	37	25	------	-----	----	---
00	--------	00	--------	00	--------	S W	14	N W	12	----	4	3	4	40	0	------	-----	----	---
100	St.	50	Cir. St.	100	St.	S E	2	S E	6	S E	10	4	4	44	15	------	-----	----	---
100	St.	100	Nim.	100	St.	S W	16	----	0	----	0	3	4	44	30	------	-----	----	---
30	Cir. Cu.	100	Cu. St.	20	Cir.	S W	4	S W	6	----	0	3	3	38	14	------	-----	----	---
00	--------	10	Cir.	70	Cir. Cu.	----	0	S W	3	S E	3	3	3	36	18	------	-----	----	---
00	--------	00	--------	00	--------	----	0	S W	6	W	2	4	6	37	20	------	-----	----	---
00	--------	80	Cu.	30	Cir. Cu.	----	0	N W	8	N W	8	4	5	32	16	------	-----	----	---
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	-----	----	---
71	--------	64	--------	69	--------	----	--	----	--	----	--	4	4.48	26°.42	9°.94	------	-----	.49	6¾
		68																	

METEOROLOGICAL OBSERVATIONS FOR

DAY OF MONTH.	THERMOMETER, IN OPEN AIR.				PRESSURE OF VAPOR, IN INCHES.			RELATIVE HUMIDITY, OR PERCENTAGE OF SATURATION.			BAROMETER, REDUCED TO FREEZING POINT.			
	7 A. M.	2 P. M.	9 P. M.	Daily Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.
1	16	21	18	18⅓	.090	.113	.098	100	100	100	29.203	29.245	29.201	29.216
2	21	26	17	21⅓	.113	.105	.094	100	75	100	29.231	29.217	29.163	29.204
3	25	29	26	26⅔	.135	.160	.123	100	100	87	28.933	28.948	29.114	28.998
4	21	30	28	26⅓	.113	.130	.153	100	78	100	29.163	29.020	28.897	29.027
5	25	30	26	27	.135	.093	.105	100	56	75	28.796	28.854	28.871	28.840
6	23	31	16	23⅓	.123	.174	.090	100	100	100	28.961	28.945	29.040	28.982
7	23	30	16	23	.106	.130	.090	86	78	100	29.270	29.284	29.363	29.306
8	18	39	36	31	.098	.152	.149	100	63	71	29.409	29.208	29.140	29.252
9	20	28	24	24	.075	.135	.111	70	88	86	29.470	29.467	29.397	29.445
10	25	40	40	35	.135	.182	.248	100	73	100	29.214	29.064	28.924	29.067
11	35	36	25	32	.204	.212	.135	100	100	100	28.736	28.559	28.587	28.627
12	15	26	13	18	.086	.141	.078	100	100	100	28.792	28.736	28.877	28.802
13	10	14	8	10⅔	.068	.067	.062	100	81	100	29.044	29.098	29.183	29.108
14	-3	7	-3	⅓	.038	.060	.038	100	100	100	29.171	29.253	29.301	29.242
15	6	23	21	16⅔	.057	.123	.113	100	100	100	29.231	29.237	29.261	29.243
16	23	30	21	24⅔	.123	.167	.113	100	100	100	29.296	29.329	29.369	29.331
17	17	23	15	18⅓	.094	.089	.086	100	72	100	29.357	29.260	29.269	29.295
10	0	24	13	12⅓	.044	.061	.078	100	47	100	29.319	29.329	29.314	29.321
19	16	23	18	19	.090	.123	.098	100	100	100	29.204	29.093	28.984	29.094
20	16	25	13	18	.090	.066	.078	100	49	100	29.260	29.337	29.436	29.344
21	6	21	22	16⅓	.057	.080	.084	100	71	71	29.408	29.247	28.992	29.216
22	29	39	29	32⅓	.123	.152	.087	77	63	54	28.734	28.777	28.651	28.721
23	18	21	11	16⅔	.067	.113	.071	68	100	100	28.651	28.819	28.921	28.797
24	11	20	17	16	.071	.075	.094	100	70	100	28.941	28.853	28.885	28.893
25	20	25	20	21⅔	.108	.117	.108	100	87	100	28.694	28.669	28.692	28.685
26	16	24	7	15⅔	.090	.094	.060	100	73	100	28.745	29.161	29.274	29.060
27	0	13	1	4⅔	.044	.063	.046	100	81	100	29.500	29.509	29.523	29.511
28	11	24	30	21⅔	.071	.129	.130	100	100	78	29.437	29.337	29.327	29.367
------	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	-------
------	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	-------
------	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	-------
Sums.	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	-------
Means	------	------	------	20.4	.095	.118	.101	96	82	97	--------	--------	--------	29.107
Average----------------------						.105			92		------------------------------			

THE MONTH OF FEBRUARY, 1879.

CLOUDS.						WINDS.						OZONE.		REGISTERING THERMOM'R.		RAIN AND SNOW.			
7 A. M.		2 P. M.		9 P. M.		7 A. M.		2 P. M.		9 P. M.									
Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Direction.	Force.	Direction.	Force.	Direction.	Force.	Day: 7 A. M. to 9 P. M.	Night: 9 P. M. to 7 A. M.	Maximum.	Minimum.	Beginning Rain or Snow.	Ending Rain or Snow.	Inches of Rain and Melt'd Snow.	Depth of Snow.
60	Cu.	00	--------	100	St.	N W	14	N W	16	N W	10	4	4	21	15	------	------	----	--
100	Cu. St.	100	Cu. St.	10	Cir. St.	N W	10	N W	8	----	0	4	5	25	13	------	------	----	--
100	Cu. St.	100	Cu. St.	100	St.	N W	4	N W	6	N W	6	5	5	29	16	4 A. M.	5 P. M.	.05	¼
100	St.	100	St.	100	Nim.	----	0	S E	8	S E	8	4	7	31	21	5 P. M.	N'ht.	.03	¼
100	Cu. St.	100	Cu. St.	100	Cu. St.	N W	10	N W	6	N W	3	6	3	30	21	------	------	----	--
100	Cu. St.	100	Nim.	00	--------	----	0	N W	6	N W	2	4	7	32	14	8 A. M.	3 P. M.	.05	¼
100	Cu. St.	30	Cu.	00	--------	----	0	W	8	----	0	3	4	32	7	------	------	----	--
100	Cir. St.	50	Cir.	100	St.	----	0	S W	12	S W	20	3	3	39	17	------	------	----	--
10	Cu.	100	Cir.	100	St.	----	0	S E	2	S E	6	4	4	28	20	------	------	----	--
60	Cir. St.	100	Cir. St.	100	St.	S W	6	S W	6	S	10	3	5	41	25	10 P. M.	------	----	--
100	Nim.	100	Nim.	100	Nim.	S	3	----	0	N W	14	4	6	36	11	------	------	----	--
60	Cir. St.	100	Nim.	00	--------	N W	4	----	0	N W	9	5	5	27	5	------	9 P. M.	.54	3
100	St.	60	Cu.	00	--------	W	6	W	8	N W	12	6	7	17	–3	Snow Sq'lls.	------	.05	¼
30	Cu. St.	100	St.	00	--------	S W	8	W	13	W	3	6	7	7	–6	------	------	----	--
60	Cu. St.	100	Nim.	100	Cu. St.	S W	6	S W	10	S W	8	5	6	23	6	------	------	----	--
100	St.	90	Cir. Cu.	70	St.	----	0	----	0	N E	4	3	5	32	13	Snow Sq'lls.	------	----	--
100	Cu. St.	100	Cu. St.	60	--------	N W	3	N W	8	N W	8	5	4	23	0	------	------	----	--
00	--------	50	Cir. St.	00	--------	----	0	W	2	----	0	5	5	25	6	------	------	----	--
100	St.	100	Nim.	100	Nim.	S E	2	S E	8	S W	1	6	7	23	11	10 A. M.	9:30 P. M.	.16	2
00	--------	100	Cu.	00	--------	N W	9	N W	12	N W	5	5	6	26	–4	------	------	----	--
100	Cu. St.	100	St.	100	Cu. St.	----	0	S	4	S E	4	5	5	29	6	Snow Sq'lls.	------	.05	--
100	St.	00	--------	00	--------	----	0	N W	13	N W	9	4	3	40	17	------	------	----	--
10	Cu.	90	Cu.	00	--------	N W	14	N W	20	----	0	3	3	21	8	------	------	----	--
100	Nim.	100	Cu. St.	100	St.	N E	1	N E	2	N E	2	5	5	20	17	6 A. M.	------	----	--
100	Nim.	100	Cu. St.	100	St.	----	0	N E	5	N E	4	6	7	27	16	------	------	----	--
100	Nim.	90	Cu.	100	Cir. St.	N E	2	N W	14	N W	8	4	5	24	–2	------	11 A. M.	.45	5
100	Cu. St.	100	Cu.	00	--------	----	0	W	7	----	0	5	5	14	–2	------	------	----	--
100	Cu. St.	100	Cu. St.	100	St.	S E	6	S E	7	S E	9	5	4	40	11	Snow Sq'lls.	------	.05	¼
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	------	----	--
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	------	----	--
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	------	----	--
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	------	1.43	11
80	--------	84	--------	56	--------	----	--	----	--	----	--	4.54	5.01	27°.64	9°.96	------	------	----	--
		73																	

METEOROLOGICAL OBSERVATIONS FOR

DAY OF MONTH.	THERMOMETER, IN OPEN AIR.				PRESSURE OF VAPOR, IN INCHES.			RELATIVE HUMIDITY, OR PERCENTAGE OF SATURATION.			BAROMETER, REDUCED TO FREEZING POINT.			
	7 A. M.	2 P. M.	9 P. M.	Daily Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.
1	26	42	35	34⅓	.123	.177	.162	87	66	80	29.431	29.416	29.317	29.388
2	6	24	30	20	.057	.094	.130	100	73	78	29.279	29.343	29.373	29.332
3	20	38	36	31⅓	.091	.165	.129	85	72	61	29.425	29.420	29.297	29.381
4	36	42	35	37⅔	.170	.134	.142	80	50	70	29.293	29.411	29.470	29.391
5	20	37	32	29⅔	.108	.136	.143	100	62	79	29.531	29.486	29.307	29.441
6	37	43	32	37⅓	.221	.142	.181	100	51	100	29.148	29.140	29.184	29.157
7	26	37	32	31⅔	.105	.116	.143	75	53	79	29.314	29.296	29.209	29.273
8	37	64	54	51⅔	.116	.403	.321	53	67	74	29.050	28.965	28.960	28.992
9	53	53	51	52⅓	.244	.374	.348	60	100	93	28.890	28.850	28.945	28.895
10	35	66	55	52	.204	.189	.321	100	31	74	29.086	28.967	28.919	28.991
11	39	45	31	38⅓	.152	.117	.136	63	39	78	29.220	29.307	29.353	29.293
12	31	47	46	41⅓	.136	.202	.169	78	62	54	29.349	29.237	28.960	29.182
13	34	38	29	33⅔	.138	.144	.142	71	63	88	29.024	29.050	29.008	29.027
14	29	27	18	24⅔	.142	.111	.082	88	75	84	28.856	28.964	29.000	28.940
15	14	18	14	15⅓	.067	.082	.082	81	84	100	29.018	29.107	29.100	29.075
16	17	26	21	21⅓	.094	.123	.113	100	87	100	29.175	29.130	29.059	29.121
17	15	26	19	20	.086	.105	.087	100	75	84	29.034	29.025	29.101	29.053
18	13	25	13	17	.063	.135	.078	81	100	100	29.126	29.141	29.153	29.140
19	18	27	22	22⅓	.098	.076	.118	100	52	100	29.180	29.161	29.139	29.160
20	24	31	28	27⅔	.094	.174	.135	73	100	88	29.193	29.108	29.045	29.115
21	27	42	28	32⅓	.129	.092	.117	88	34	76	29.091	29.119	29.170	29.127
22	29	31	27	29	.142	.142	.129	88	84	88	28.940	28.879	29.129	28.983
23	28	40	38	35⅓	.117	.160	.144	76	64	63	29.192	29.146	29.044	29.127
24	40	37	29	35⅓	.182	.157	.123	73	71	77	28.740	28.972	29.210	28.941
25	20	42	35	32⅓	.091	.092	.204	85	34	100	29.301	29.243	29.147	29.230
26	33	35	33	33⅔	.150	.204	.188	80	100	100	28.915	28.864	28.839	28.873
27	32	36	34	34	.181	.129	.196	100	61	100	28.981	29.184	29.160	29.108
28	34	50	47	43⅔	.196	.258	.323	100	71	100	28.735	28.905	28.809	28.816
29	42	51	38	43⅔	.267	.196	.165	100	52	72	28.809	28.766	28.786	28.787
30	35	37	30	34	.162	.116	.076	80	53	45	28.814	28.851	28.916	28.860
31	23	46	36	35	.089	.082	.129	72	26	61	29.010	28.951	28.906	28.956
Sums	------	------	------	------	------	------	------	-----	------	------	--------	--------	--------	-------
Means	------	------	------	33°.19	.136	.156	.163	88	65	82	--------	--------	--------	29.102
Average					.152			78			--------------------------------			

THE MONTH OF MARCH, 1878.

CLOUDS.						WINDS.						OZONE.		REGISTERING THERMOM'R.		RAIN AND SNOW.			
7 A. M.		2 P. M.		9 P. M.		7 A. M.		2 P. M.		9 P. M		Day: 7 A. M. to 2 P. M.	Night: 9 P. M. to 7 A. M.	Maximum.	Minimum.	Beginning Rain or Snow.	Ending Rain or Snow.	Inches of Rain and Melt'd Snow.	Depth of Snow.
Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Direction.	Force.	Direction.	Force	Direction.	Force.								
50	St.	00	--------	00	--------	S W	1	S W	13	S W	4	4	2	42	17	------	----	----	----
00	--------	20	Cu. St.	00	--------	S W	4	----	0	S W	4	5	3	24	4	------	----	----	----
30	Cu. St.	30	Cir.	00	--------	N W	3	N W	4	N W	9	4	3	38	25	------	----	----	----
00	--------	20	Cu.	00	--------	S W	10	S W	9	S W	3	5	5	42	20	------	----	----	----
50	Cir. St.	100	Cu. St.	100	St.	----	0	S E	6	S E	10	4	7	38	20	------	----	----	----
100	Nim.	00	--------	60	Cir. St.	S W	5	S W	12	W	4	4	3	43	26	------	----	----	----
90	Cir. St.	60	Cir. St.	100	Cir. St.	N E	3	S E	4	S E	6	3	5	38	26	------	----	----	----
00	--------	00	--------	00	--------	S	6	S	6	S	7	4	5	64	48	------	----	----	----
10	Cir. St.	100	Nim.	00	--------	S W	9	S W	10	S W	6	4	3	60	32	11 A. M.	6 P. M.	.55	- --
00	--------	60	--------	50	St.	----	0	S W	10	S W	8	3	3	66	32	------	----	----	----
00	--------	60	--------	00	--------	N W	6	W	6	W	7	3	2	45	27	------	----	----	----
90	Cir. St.	70	Cir. Cu.	100	Cu. St.	----	0	S E	12	S E	5	3	3	48	34	------	----	----	----
100	Cu.	50	Cu.	00	--------	N W	22	S W	9	----	0	2	3	41	26	------	----	----	----
100	Cu. St.	100	Cu.	00	--------	N W	15	N W	16	N W	4	4	5	30	14	------	----	----	----
80	Cu.	60	Cu.	50	St.	S W	15	S W	8	S W	1	5	6	19	12	------	----	----	----
100	Nim.	100	Cu.	100	St.	W	2	S W	8	----	0	4	5	26	13	------	----	----	----
100	Cir. St.	90	Cu.	00	--------	----	0	W	12	W	5	4	5	27	10	------	----	----	----
00	--------	100	Nim.	00	--------	----	0	S W	6	----	0	5	5	27	11	------	----	----	----
100	Cu.	60	Cu.	20	St.	----	0	S W	7	S W	2	2	3	28	17	------	----	----	----
100	Cir. St.	100	Cu. St.	100	Nim.	----	0	----	0	----	0	3	6	32	24	Snow Sq'll.	----	----	----
90	Cu.	10	Cu.	00	--------	----	0	S W	5	----	0	4	5	42	26	Night.	----	----	----
100	Nim.	100	Nim.	100	Cu. St.	N E	6	N E	4	----	0	6	5	31	26	------	8 P. M.	.15	¾
100	Cu. St.	60	Cu.	100	Cu. St.	----	0	S W	4	S E	9	4	5	42	28	------	----	----	----
100	Cu. St.	100	Cu. St	00	--------	S W	16	N W	18	N W	7	5	4	40	15	------	----	----	----
00	--------	90	Cir. Cu.	100	Cir. St.	----	0	S W	3	S E	3	4	2	44	19	------	----	----	----
90	St.	100	Nim.	100	Nim.	S E	8	N E	5	N E	3	3	7	37	32	9 A. M.	9 P. M.	.35	½
100	St.	100	St.	50	Cir. St.	N W	3	S	1	----	0	6	6	37	32	------	----	----	----
90	Cir. St.	100	Nim.	100	Nim.	S	5	S W	9	S W	2	5	7	53	34	1.45 P. M.	10 P. M.	.52	..
90	Cu.	100	Cu.	10	St.	----	0	N W	15	N W	8	4	3	55	33	------	----	----	----
100	Cu.	100	Cu.	00	--------	N W	6	N W	14	N W	4	4	4	42	20	------	----	----	----
00	--------	50	Cir. St.	00	--------	N W	4	N W	5	N W	5	2	3	47	23	------	----	----	----
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	----	1.57	1¼
64	--------	61	--------	40	--------	----	--	----	--	----	--	3.93	4.30	40°.86	23°.42	------	----	----	----
		56																	

METEOROLOGICAL OBSERVATIONS FOR

DAY OF MONTH.	THERMOMETER, IN OPEN AIR.				PRESSURE OF VAPOR, IN INCHES.			RELATIVE HUMIDITY, OR PERCENTAGE OF SATURATION.			BAROMETER, REDUCED TO FREEZING POINT.			
	7 A. M.	2 P. M.	9 P. M.	Daily Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.
1	35	37	24	32	.142	.116	.111	70	53	86	28.784	28.810	23.921	28.838
2	20	34	23	25⅔	.091	.155	.123	85	79	100	28.961	28.885	28.858	28.901
3	19	26	23	22⅔	.103	.141	.123	100	100	100	28.896	28.891	28.960	28.916
4	25	34	27	28⅔	.135	.155	.147	100	79	100	28.984	28.994	29.069	29.016
5	23	42	31	32	.123	.113	.118	100	42	68	29.171	29.149	29.157	29.159
6	31	51	44	42	.118	.126	.289	68	34	100	29.134	29.029	29.020	29.061
7	32	51	36	39⅔	.162	.126	.129	89	34	61	29.127	29.110	29.179	29.139
8	32	62	39	44⅓	.101	.101	.152	100	18	63	29.223	29.172	29.123	29.173
9	46	62	46	51⅓	.116	.150	.311	47	27	100	29.039	28.893	28.693	28.875
10	47	44	33	41⅓	.323	.265	.168	100	92	89	28.487	28.613	28.830	28.643
11	30	43	27	33⅓	.130	.100	.147	78	36	100	29.101	29.159	29.240	29.167
12	25	53	36	38	.135	.100	.119	100	25	71	29 301	29.182	29.103	29.195
13	41	50	38	43	.255	.258	.186	91	71	81	28.943	28.830	28.925	28.899
14	31	54	41	42	.155	.157	.126	89	38	49	28.931	28.879	28.828	28.879
15	35	53	39	42⅓	.127	.146	.195	62	36	82	28.813	28.839	28.945	28.866
16	32	53	38	41	.181	.116	.165	100	36	72	29.010	29.099	28.990	29.033
17	36	44	35	38⅓	.170	.151	.108	80	52	53	29.024	29.063	29.086	29.058
18	33	50	39	40⅔	.131	.117	.173	70	32	73	29.116	29.052	29.069	29.079
19	37	57	40	44⅔	.116	.216	.139	53	46	56	29.077	29.091	29.136	29.101
20	49	61	43	48	.139	.216	.142	56	40	51	29.220	29.193	29.180	29.198
21	32	69	49	50	.143	.163	.175	79	23	50	29.292	29.340	29.390	29.341
22	40	73	54	55⅔	.077	.166	.206	31	20	49	29.490	29.439	29.392	29.440
23	56	72	55	61	.255	.266	.295	57	34	68	29.370	29.348	29.366	29.361
24	49	81	68	66	.223	.238	.290	64	22	42	29.273	29.062	29.006	29.114
25	62	74	58	64⅔	.429	.331	.394	77	39	82	28.887	28.936	28.986	28.936
26	62	77	61	66⅔	.429	.422	.473	77	46	88	29.027	28.977	29.008	29.004
27	60	75	52	62⅓	.456	.628	.388	83	73	100	28.992	28.933	28.931	28.952
28	47	62	45	51⅓	.225	.129	.204	70	27	68	29.098	29.119	29.143	29.120
29	50	62	45	52⅓	.210	.370	.204	58	66	68	29.097	29.079	29.066	29.081
30	40	55	38	44⅓	.182	.129	.123	73	28	54	29.124	29 081	29.055	29.087
31	------	------	------	------	------	------	-----	------	------	------	--------	--------	--------	-------
Sums.	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	-------
Means	------	------	------	41°.84	.189	.196	.198	78	45	74	--------	--------	--------	29.050
Average						.195			66					

THE MONTH OF APRIL, 1879.

CLOUDS.						WINDS.						OZONE.		REGISTERING THERMOM'R.		RAIN AND SNOW.			
7 A. M.		2 P. M.		9 P. M.		7 A. M.		2 P. M.		9 P. M.									
Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Direction.	Force.	Direction.	Force.	Direction.	Force.	Day: 7 A. M. to 2 P. M.	Night: 9 P. M. to 7 A. M.	Maximum.	Minimum.	Beginning Rain or Snow.	Ending Rain or Snow.	Inches of Rain and Melt'd Snow.	Depth of Snow.
100	Nim.	90	Cu.	100	Cir. St.	S W	8	N W	16	N W	17	3	3	40	12	6 A. M.	------	----	--
5	Cu.	100	Nim.	00	--------	N W	12	N W	6	N W	8	3	5	35	15	------	Snow Sq'lls.	----	--
100	Nim.	100	Nim.	100	Nim.	N W	14	W	16	N W	14	5	6	27	12	6 A. M.	Night.	.20	¾
90	St.	100	Cir. St.	30	Cir. St.	N W	12	N W	14	N W	10	4	5	34	18	------	------	----	--
5	St.	60	Cir. Cu.	00	--------	W	6	W	6	S W	4	2	2	44	22	------	------	----	--
30	Cir. Cu.	100	Cir. St.	100	St.	S W	1	S W	8	N W	5	3	7	55	21	------	------	----	--
20	St.	00	--------	00	--------	N W	4	N W	8	----	0	5	5	53	27	------	------	----	--
00	--------	00	--------	00	--------	S W	1	S W	4	----	0	3	3	62	32	------	------	----	--
80	Cir. St.	100	Cu. St.	100	Nim.	S E	3	S E	5	S E	6	4	8	62	44	3:30 P. M.	------	----	--
100	Nim.	100	Cu.	100	Cu. St.	S E	4	N E	1	N W	12	6	4	51	27	------	7 A. M.	.67	--
00	--------	10	Cu.	00	--------	N W	6	N W	8	----	0	3	3	44	20	------	------	----	--
10	St.	20	Cir. St.	00	--------	----	8	S W	3	----	0	4	5	53	25	------	------	----	--
100	Nim.	100	Cu.	00	--------	S W	1	N W	6	N	3	4	6	52	26	Shower.	------	.11	--
100	St.	20	Cir. St.	90	Cu. St.	----	0	N E	2	N E	3	4	4	55	30	------	------	----	--
100	Cir. Cu.	00	--------	00	--------	N E	5	N E	6	----	0	2	4	56	29	------	------	----	--
100	Cu.	90	Cu.	10	Cu.	N E	3	N E	6	N E	10	3	6	53	32	------	------	----	--
100	Cu.	80	Cu.	00	--------	N E	7	N E	13	N E	6	3	3	45	24	------	------	----	--
00	--------	00	--------	00	--------	N E	5	N W	9	N W	6	2	4	52	29	------	------	----	--
30	Cir.	00	--------	00	--------	N W	6	N W	8	----	0	0	2	58	26	------	------	----	--
50	Cir. St.	5	St.	00	--------	N E	2	S W	1	----	0	2	3	63	28	------	------	----	--
00	--------	00	--------	00	--------	----	0	S W	3	----	0	2	2	69	36	------	------	----	--
00	--------	30	Cir.	00	--------	----	0	S	5	----	0	2	3	74	48	------	------	----	--
00	--------	50	Cir. Cu.	00	--------	----	0	N E	10	----	0	4	5	80	46	------	------	----	--
30	Cir.	60	Cir.	100	Cir. St.	S E	6	S W	8	S E	5	3	3	81	49	------	------	----	--
100	Cu.	----	--------	60	Cir. Cu.	S W	14	W	14	----	0	2	3	74	49	------	------	----	--
20	Cir. St.	90	Cu.	100	Nim.	S W	2	S	12	----	0	4	6	78	56	6:30 P. M.	------	----	--
100	Cu. St.	90	Cu.	100	Nim.	S W	1	S W	4	S W	6	0	4	75	41	------	Night.	.25	--
00	--------	00	--------	00	--------	N W	12	N W	12	----	0	4	3	62	41	------	------	----	--
100	Cir. St.	90	Cu.	00	--------	S	4	N W	8	N W	10	0	3	64	38	Shower	------	.02	--
00	--------	00	--------	00	--------	N W	12	N W	14	N W	4	4	0	57	28	------	------	----	--
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	------	----	--
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	------	1.25	¾
49	--------	50	--------	33	--------	----	--	----	--	----	--	3	4	56°.93	31°.00	------	-----	----	--

44

62

METEOROLOGICAL OBSERVATIONS FOR

DAY OF MONTH.	THERMOMETER, IN OPEN AIR.				PRESSURE OF VAPOR, IN INCHES.			RELATIVE HUMIDITY, OR PERCENTAGE OF SATURATION.			BAROMETER, REDUCED TO FREEZING POINT.			
	7 A. M.	2 P. M.	9 P. M.	Daily Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.
1	32	56	41	43	.181	.282	.126	100	63	49	29.088	29.100	29.122	29.103
2	35	53	42	43⅓	.162	.123	.155	80	30	58	29.168	29.130	29.081	29.126
3	42	57	40	46⅓	.177	.268	.203	66	58	82	29.065	29.042	29.062	29.056
4	42	61	53	52	.222	.297	.244	83	55	60	28.752	28.624	28.698	28.691
5	52	51	43	48⅔	.257	.196	.186	66	52	67	28.693	28.871	29.009	28.858
6	40	52	43	45	.203	.136	.209	82	35	75	29.170	29.270	29.340	29.260
7	41	50	38	43	.190	.162	.144	74	45	63	29.399	29.397	29.407	29.401
8	28	62	50	46⅔	.117	.150	.162	76	27	45	29.429	29.423	29.409	29.420
9	46	69	58	57⅔	.169	.191	.229	54	27	47	29.417	29.400	29.343	29.387
10	56	78	62	65⅓	.282	.216	.370	63	22	66	29.300	29.185	29.111	29.199
11	70	85	72	75⅔	.385	.493	.455	53	41	58	29.010	28.956	29.077	29.014
12	69	88	64	73⅔	.398	.416	.433	56	31	73	29.011	29.013	29.029	29.018
13	70	86	64	73⅓	.449	.371	.464	61	30	77	29.067	28.995	29.023	29.028
14	64	78	57	66⅓	.497	.514	.466	83	54	100	28.983	28.869	28.903	28.918
15	47	51	45	47⅔	.323	.221	.300	100	59	100	28.979	28.977	29.033	28.996
16	46	70	50	55⅓	.311	.263	.309	100	36	85	29.116	29.075	29.100	29.097
17	52	76	55	61	.334	.273	.321	86	30	74	29.182	29.156	29.139	29.159
18	56	77	59	64	.391	.356	.410	87	38	82	29.163	29.116	29.104	29.128
19	51	78	58	62⅓	.374	.278	.365	100	29	76	29.125	29.033	28.991	29.050
20	64	86	67	72⅓	.464	.518	.393	77	42	59	28.927	28.861	28.917	28.902
21	52	60	48	53⅓	.257	.203	.260	66	39	78	29.137	29.195	29.253	29.195
22	50	67	50	55⅔	.234	.246	.234	65	37	65	29.383	29.369	29.403	29.385
23	48	70	58	58⅔	.189	.234	.203	56	32	42	29.453	29.440	29.359	29.417
24	56	84	67	69	.255	.397	.489	57	34	75	29.270	29.148	29.066	29.161
25	62	64	55	60⅓	.556	.433	.405	100	73	94	29.091	29.103	29.188	29.127
26	43	54	53	50	.209	.181	.219	75	43	54	29.262	29.273	29.209	29.248
27	50	63	51	54⅔	.258	.299	.296	71	52	79	29.162	29.183	29.230	29.192
28	46	74	64	61⅓	.286	.363	.433	92	43	73	29.302	29.242	29.162	29.235
29	65	70	72	69	.516	.658	.559	84	90	72	29.078	29.013	28.927	29.006
30	73	84	68	75	.617	.545	.476	77	47	69	28.843	28.858	28.936	28.879
31	68	84	64	72	.577	.623	.596	85	53	100	28.970	28.908	28.936	28.938
Sums	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	-------
Means	------	------	------	58°.76	.317	.320	.326	77	43	71	--------	--------	--------	29.116
Average-------------------						.321			64		----------------------------------			

THE MONTH OF MAY, 1879.

CLOUDS.						WIND.						OZONE.		REGISTERING THERMOM'R.		RAIN AND SNOW.			
7 A. M.		2 P. M.		9 P. M.		7 A. M.		2 P. M.		9 P. M.									
Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Direction.	Force.	Direction.	Force.	Direction.	Force.	Day: 7 A. M. to 2 P. M.	Night: 9 P. M. to 7 A. M.	Maximum.	Minimum.	Beginning Rain or Snow.	Ending Rain or Snow.	Inches of Rain and Melt'd Snow.	Depth of Snow.
00	--------	00	--------	00	--------	----	0	----	0	----	0	----	2	57	27	------	-----	----	---
00	--------	00	--------	00	--------	N W	4	N W	2	----	0	----	2	59	28	------	-----	----	---
00	--------	90	Cir. St.	100	St.	----	0	N W	4	S E	4	----	5	66	42	11 P. M.	-----	----	---
100	Nim.	30	Cu.	10	Cu.	----	0	N W	16	S W	12	4	4	63	49	------	9 A. M.	.26	---
70	Cu.	100	Cu.	00	--------	W	10	N W	16	W	10	4	4	57	33	------	-----	----	---
100	Cu.	100	Cu.	100	Cu.	N W	4	N W	4	----	0	3	3	52	32	------	-----	----	---
90	Cir.	90	Cu.	00	--------	----	0	N W	2	----	0	4	3	54	25	------	-----	----	---
00	--------	00	--------	00	--------	----	0	E	3	S E	3	4	2	65	32	------	-----	----	---
30	Cir.	10	Cir.	00	--------	----	0	S W	4	----	0	2	3	70	44	------	-----	----	---
50	Cir.	50	Cir.Cu.	50	Cir.	----	0	S	8	S E	4	5	4	80	59	In Night.	-----	.01	---
90	Cir.	20	Cu.	00	--------	S W	16	S W	18	S	4	2	4	86	63	------	-----	----	---
90	Cir.Cu.	00	--------	60	Cir.Cu.	S W	8	S W	8	----	0	4	3	90	59	------	-----	----	---
00	--------	50	Cu.	100	Cu. St.	----	0	S W	8	S E	4	4	4	91	56	5 P. .M	-----	----	---
30	Cir.Cu.	100	Cu.	100	Cu. St.	----	0	S E	4	N E	8	3	5	81	46	------	8 P.M.	1.03	---
100	Nim.	00	--------	00	--------	N E	4	----	0	----	0	4	4	51	36	------	-----	----	---
00	--------	00	--------	00	--------	----	0	N	6	----	0	3	2	70	38	------	-----	----	---
5	Cu.	60	Cir.	00	--------	----	0	----	0	----	0	3	1	81	41	------	-----	----	---
00	--------	10	Cir.	00	--------	N E	4	N E	4	----	0	2	1	80	39	------	-----	----	---
00	--------	30	Cir.	00	--------	----	0	S E	6	----	0	2	2	80	52	------	-----	----	---
20	Cir.	70	Cu. St.	00	--------	S W	4	S W	8	W	4	2	2	88	47	------	-----	----	---
100	St.	10	St.	00	--------	N E	8	N	10	----	0	2	1	64	31	------	-----	----	---
00	--------	00	--------	30	St.	N E	4	N E	2	----	0	1	2	68	36	------	-----	----	---
30	St.	10	Cir.	50	St.	E	4	S	8	S	4	1	2	68	46	------	-----	----	---
10	St.	80	Cir. St.	00	--------	S W	4	S W	8	----	0	1	2	85	52	------	-----	----	---
100	Nim.	100	Cu. St.	100	St.	N E	6	N E	8	----	0	3	2	69	40	5 A. M.	1 P.M.	.40	---
100	Cu. St.	100	Cu. St.	100	Cu. St.	N E	4	E	4	----	0	2	2	60	42	------	-----	----	---
100	St.	100	Cu. St.	00	--------	----	0	W	8	----	0	2	1	70	39	------	-----	----	---
00	--------	40	St.	100	Cir. Cu.	----	0	W	2	----	0	3	3	76	46	------	-----	----	---
10	Cir.	70	Cu. St.	00	--------	S	4	S W	12	S E	12	4	3	88	63	12 M.	1 P.M.	.35	---
00	--------	30	Cir.	00	--------	S	8	S W	8	----	0	1	2	87	62	5 A. M.	5:15 A. M.	.10	---
80	Cir.	100	Cu.	100	Cu. St.	S E	4	S W	8	----	0	3	3	87	52	5 P. M.	9 P.M.	.30	---
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	-----	----	---
41	--------	47	--------	32	--------	----	--	----	--	----	--	2.79	2.68	72°.35	43°.77	------	-----	2.45	---
		40																	

METEOROLOGICAL OBSERVATIONS FOR

DAY OF MONTH.	THERMOMETER, IN OPEN AIR.				PRESSURE OF VAPOR, IN INCHES.			RELATIVE HUMIDITY, OR PERCENTAGE OF SATURATION.			BAROMETER, REDUCED TO FREEZING POINT.			
	7 A. M.	2 P. M.	9 P. M.	Daily Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.
1	52	51	46	49⅔	.388	.374	.311	100	100	100	29.029	29.105	29.165	29.100
2	45	58	54	52⅓	.275	.365	.390	92	76	93	29.166	29.122	29.102	29.130
3	52	54	50	52	.361	.418	.361	93	100	100	29.064	29.021	28.987	29.024
4	51	73	67	63⅔	.348	.442	.522	93	55	79	28.952	28.896	28.854	28.901
5	61	73	60	64⅔	.473	.545	.426	88	67	82	28.966	28.966	28.989	28.974
6	53	64	45	54	.321	.230	.251	80	38	84	29.003	29.148	29.209	29.120
7	46	70	52	56	.192	.323	.334	62	44	86	29.354	29.303	29.248	29.302
8	64	78	64	68⅔	.403	.375	.403	67	39	67	29.300	29.225	29.149	29.225
9	60	85	69	71⅓	.396	.397	.430	76	34	61	29.110	29.001	28.926	29.012
10	70	82	62	71⅓	.621	.626	.460	85	65	83	28.838	28.864	28.948	28.883
11	64	78	62	68	.497	.588	.556	83	62	100	29.097	28.962	28.960	29.003
12	64	80	64	72⅔	.529	.487	.464	89	48	77	29.006	29.025	29.073	29.035
13	62	80	63	68⅓	.460	.349	.386	83	44	67	29.159	29.107	29.060	29.109
14	62	65	66	64⅓	.399	.583	.570	72	94	89	28.969	28.777	28.657	28.801
15	70	77	56	67⅔	.586	.601	.449	80	65	100	28.520	28.514	28.664	28.566
16	54	70	53	59	.390	.353	.269	93	48	67	28.862	28.972	29.118	28.984
17	47	67	51	55	.249	.303	.321	77	46	86	29.312	29.300	29.329	29.314
18	53	70	58	60⅓	.348	.323	.365	86	44	76	29.407	29.448	29.346	29.400
19	54	75	61	63⅓	.335	.519	.297	80	60	55	29.402	29.349	29.310	29.354
20	63	80	61	68	.356	.561	.413	62	55	77	29.300	29.182	29.176	29.219
21	69	83	59	70⅓	.462	1.030	.500	65	91	100	29.134	29.089	28.103	29.109
22	64	82	70	72	.529	.650	.464	89	59	77	29.164	29.157	29.162	29.161
23	66	90	68	74⅔	.536	.665	.658	84	47	90	29.174	29.127	29.117	29.139
24	74	89	75	79⅓	.641	.678	.826	77	50	95	29.165	29.107	29.081	29.118
25	79	92	71	80⅔	.856	.680	.682	87	46	90	29.096	29.059	29.075	29.077
26	76	83	74	77⅔	.652	.637	.680	73	56	81	29.082	29.018	28.999	29.033
27	72	86	67	75	.745	.610	.662	95	50	100	29.013	29.055	28.895	28.988
28	62	66	59	62⅓	.491	.639	.500	88	100	100	28.893	28.876	28.891	28.887
29	63	76	65	68	.446	.541	.483	77	50	78	28.974	29.006	29.056	29.012
30	63	82	66	70⅓	.510	.460	.470	88	42	73	29.229	29.204	29.216	29.216
------	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	-------
Sums	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	-------
Means	------	------	------	66.02	.460	.512	.463	82	59	84	--------	--------	--------	29.073
Average						.478			75		--------			

THE MONTH OF JUNE, 1879.

CLOUDS.						WINDS.						OZONE.		REGISTERING THERMOM'R.		RAIN AND SNOW.			
7 A. M.		2 P. M.		9 P. M.		7 A. M.		2 P. M.		9 P. M.		Day: 7 A. M. to 2 P. M.	Night: 9 P. M. to 7 A. M.	Maximum.	Minimum.	Beginning Rain or Snow.	Ending Rain or Snow.	Inches of Rain and Melt'd Snow.	Depth of Snow.
Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Direction.	Force.	Direction.	Force.	Direction.	Force.								
100	Cu. St.	190	Nim.	100	Cu. St.	N E	1	N E	4	N W	2	4	5	52	43	4 A. M.	9 P. M.	1.22	--
100	Cu. St.	100	Cu. St.	100	Cu. St.	N	1	N	1	----	0	3	1	59	45	------	------	----	--
100	St.	100	Nim.	60	Cu.	----	0	W	3	----	0	2	2	57	44	8 A. M.	7:30 P. M.	.28	--
70	Cu.	90	Cu.	90	Cir. Cu.	W	1	S W	5	W	3	4	3	76	50	------	------	----	--
60	Cir.	70	Cu.	00	--------	S W	4	S W	1	----	0	3	2	76	50	------	------	----	--
100	Cir. St.	00	--------	00	--------	N W	2	N	5	----	0	2	2	66	33	------	------	----	--
00	--------	00	--------	00	--------	S E	2	S W	4	----	0	1	2	72	45	------	------	----	--
00	--------	00	--------	00	--------	S W	1	S	2	----	0	2	2	80	50	------	------	----	--
00	--------	60	Cir.	00	--------	S	1	S W	5	S W	4	3	1	87	60	------	------	----	--
90	Cir. Cu.	90	Cu. St.	00	--------	S W	3	S W	8	----	0	1	2	88	50	------	------	----	--
30	Cir. St.	100	Cu. St.	00	--------	----	0	W	6	----	0	3	1	83	54	Shower.	------	.04	--
10	Cu.	30	Cu.	00	--------	N	5	N W	6	N E	1	2	1	83	48	------	------	----	--
20	Cir. St.	00	--------	00	--------	N	1	E	2	S	1	2	2	82	54	10:30 A. M.	------	----	--
100	Cu. St.	100	Nim.	00	--------	S	3	S E	2	S E	6	3	3	72	60	------	------	----	--
100	Cu.	50	Cu.	100	Nim.	S W	3	S W	9	N E	8	3	5	77	51	------	10 P. M.	.47	--
20	Cu.	50	Cu.	00	--------	N	4	N E	6	N E	3	3	2	71	37	------	------	----	--
00	--------	40	Cu.	00	--------	N	3	N W	6	----	0	2	2	70	40	------	------	----	--
00	--------	60	Cu.	10	Cu.	N	1	N	4	----	0	3	0	75	41	------	------	----	--
00	--------	00	--------	00	--------	----	0	E	3	S E	1	2	2	79	45	------	------	----	--
00	--------	30	Cir.	00	--------	S	2	S	6	----	0	2	2	84	55	------	------	----	--
90	Cir. Cu.	100	Nim.	20	St.	S W	3	----	0	----	0	3	5	85	56	2 P. M.	7 P. M.	.49	--
100	St.	10	Cu.	00	--------	----	0	W	3	----	0	3	0	85	53	------	------	----	--
00	--------	30	Cu.	00	--------	----	0	S W	4	----	0	1	1	93	60	------	------	----	--
00	--------	40	Cu.	10	Cir.	S W	1	S W	7	S E	1	2	3	95	62	------	------	----	--
60	Cir. St.	50	Cu.	90	Cir. Cu.	S W	1	S W	5	----	0	3	1	95	65	------	------	----	--
20	Cir.	100	Cu.	100	Cu.	S W	2	S W	8	S	4	2	2	91	67	Showers.	------	.19	--
90	Cu.	40	Cu.	100	Nim.	S W	3	S W	6	S W	7	2	4	89	58	7 P. M.	------	----	--
100	Cu. St.	100	Cu.	70	Cir. Cu.	N	1	N W	2	----	0	3	0	67	52	------	1 A. M.	.18	--
00	--------	60	Cu.	70	Cu.	N	3	N W	4	----	0	2	0	81	52	------	------	----	--
00	--------	30	Cu.	00	--------	----	0	E	2	----	0	2	3	85	53	------	------	----	--
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	------	----	--
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	------	2.87	--
45	--------	51	--------	31	--------	----	--	----	--	----	--	2.43	2.03	78°.50	51°.10	------	------	----	--
		43																	

METEOROLOGICAL OBSERVATIONS FOR

DAY OF MONTH.	THERMOMETER, IN OPEN AIR.				PRESSURE OF VAPOR, IN INCHES.			RELATIVE HUMIDITY, OR PERCENTAGE OF SATURATION.			BAROMETER, REDUCED TO FREEZING POINT.			
	7 A. M.	2 P. M.	9 P. M.	Daily Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.
1	66	85	67	72⅔	.543	.420	.457	79	35	69	29.282	29.198	29.195	29.225
2	68	91	73	77⅓	.612	.529	.581	90	36	72	29.216	29.165	29.208	29.196
3	75	83	79	79	.705	.759	.856	81	67	87	29.120	29.023	28.941	29.028
4	65	74	60	66⅓	.483	.532	.456	78	63	88	29.086	29.164	29.215	29.155
5	66	83	66	71⅔	.470	.581	.470	73	72	73	29.304	29.262	29.248	29.271
6	71	86	77	78	.340	.581	.841	45	72	91	29.202	29.113	29.052	29.122
7	67	81	71	73	.662	.664	.682	100	62	90	28.933	28.896	28.880	28.903
8	74	85	68	75⅔	.680	.863	.502	81	72	78	28.915	29.061	29.037	29.004
9	67	85	70	74	.522	.650	.516	79	54	70	29.058	28.988	29.005	29.017
10	73	79	76	76	.693	.856	.854	85	87	95	28.983	28.899	28.849	28.910
11	78	80	67	75	.744	.800	.591	78	78	89	28.726	28.696	28.822	28.781
12	65	84	71	73⅓	.583	.623	.572	94	53	76	28.923	28.936	28.957	28.937
13	74	90	73	79	.604	.582	.655	73	41	81	29.017	28.994	29.001	29.004
14	74	95	74	81	.718	.728	.604	86	44	73	29.092	29.063	29.103	29.086
15	80	96	80	85⅓	.758	.670	.677	74	39	66	29.138	29.061	29.047	29.082
16	77	91	66	78	.758	.451	.346	82	31	54	29.035	28.984	29.054	29.024
17	64	74	59	65⅔	.429	.396	.410	77	48	82	29.161	29.135	29.156	29.151
18	59	79	65	67⅔	.439	.396	.583	88	40	94	29.198	29.185	29.211	29.198
19	65	82	67	71⅓	.451	.534	.333	73	49	50	29.266	29.211	29.194	29.224
20	65	89	67	70⅓	.516	.440	.591	84	32	89	29.219	29.211	29.162	29.197
21	74	92	74	80	.240	.476	.497	28	32	59	29.181	29.102	29.094	29.126
22	67	81	73	73⅔	.662	.829	.732	100	79	90	29.006	28.934	28.939	28.960
23	73	81	67	73⅔	.732	.510	.489	90	48	75	28.877	28.874	28.967	28.906
24	66	75	64	68⅓	.536	.591	.563	84	68	94	29.056	29.050	29.056	29.054
25	64	80	69	71	.529	.677	.635	89	66	90	29.016	28.946	28.925	28.962
26	67	84	64	71⅔	.591	.433	.570	89	37	89	28.900	28.864	28.900	28.888
27	70	82	66	72⅔	.586	.460	.502	80	42	78	28.941	28.979	29.030	28.983
28	64	86	70	73⅓	.529	.407	.482	89	33	66	29.029	28.975	28.987	28.997
29	67	83	67	72⅓	.612	.447	.489	90	40	75	29.020	29.024	29.077	29.040
30	68	83	66	72⅓	.476	.447	.502	69	40	78	29.144	29.134	29.155	29.144
31	70	88	69	75⅔	.551	.650	.496	75	49	70	29.200	29.186	29.157	29.181
Sums	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Means	------	------	------	74°.03	.573	.580	.565	80	52	80	------	------	------	29.057
Average					.573			71			------			

THE MONTH OF JULY, 1879.

CLOUDS.						WINDS.						OZONE.		REGISTERING THERMOM'R.		RAIN AND SNOW.			
7 A. M.		2 P. M.		9 P. M.		7 A. M.		2 P. M.		9 P. M.									
Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Direction.	Force.	Direction.	Force.	Direction.	Force.	Day: 7 A. M. to 2 P. M.	Night: 9 P. M. to 7 A. M.	Maximum.	Minimum.	Beginning Rain or Snow.	Ending Rain or Snow.	Inches of Rain and Melt'd Snow.	Depth of Snow.
00	--------	00	--------	00	--------	S E	4	S	4	----	0	3	1	88	61	------	------	----	--
50	Cir.Cu.	90	Cu.	100	Cu.	S W	4	S W	8	----	0	3	3	95	65	In Ni	ght.	.10	--
100	Cir.Cu.	100	Nim.	90	Cu. St.	S W	5	S W	12	S W	8	3	4	90	65	------	------	----	--
100	Cu.	60	Cu.	00	--------	N	12	N	4	----	0	2	2	76	49	------	------	----	--
50	Cir.	60	Cu.	00	--------	E	1	N E	2	----	0	1	2	84	65	------	------	----	--
00	--------	60	Cir. St.	100	Nim.	S W	4	S W	7	S W	4	3	3	89	65	8:30 P. M.	------	----	--
100	Nim.	90	Cu.	00	--------	----	0	N E	8	S W	2	5	1	82	65	------	9 A. M.	.31	--
100	Cu. St.	10	Cir. St.	00	--------	N W	6	W	12	W	1	1	½	87	55	In Ni	ght.	.09	--
100	Cu. St.	30	Cu.	00	--------	S W	3	W	8	----	0	3	4	87	59	------	------	----	--
100	Cu. St.	100	Cu. St.	70	Cu. St.	----	0	S W	6	----	0	4	½	83	65	10 A. M.	Night	.17	--
30	Cir.Cu.	90	Cu. St.	00	--------	S W	5	W	8	----	0	5	3	89	52	10 A. M.	3 P. M.	.09	--
00	--------	30	Cu.	00	--------	----	0	W	1	S W	4	4	3	89	59	------	------	----	--
10	Cir.Cu.	20	Cu.	10	Cir.	S	1	S W	8	----	0	3	4	95	62	------	------	----	--
10	Cir.	20	Cu.	00	--------	S W	4	W	8	----	0	3	3	97	69	------	------	----	--
90	Cir.Cu.	20	Cir.	00	--------	S W	4	S W	8	----	0	3	2	96	70	------	------	----	--
60	Cir.Cu.	10	Cir.	10	Cir.	0	--	S W	12	N W	2	3	2	91	49	------	------	----	--
00	--------	30	Cir.Cu.	00	--------	W	4	N W	4	----	0	3	2	78	47	------	------	----	--
00	--------	50	Cir.Cu.	00	--------	----	0	W	3	----	0	1	2	82	48	------	------	----	--
00	--------	00	--------	00	--------	N W	1	W	3	N W	2	2	3	85	52	------	------	----	--
60	Cir.Cu.	00	--------	00	--------	S E	1	S W	3	----	0	3	1	89	53	------	------	----	--
00	--------	10	Cir.	00	--------	0	--	S	5	----	0	3	4	94	60	Night	------	----	--
100	Nim.	90	Cu.	20	Cu.	S	6	W	5	----	0	4	1	84	64	------	Night	1.13	--
100	Cu. St.	80	Cu.	00	--------	0	--	N	4	N	1	4	----	84	56	3:30 P. M.	4 P. M.	.25	--
90	Cu. St.	00	--------	10	Cu. St.	N W	3	W	2	----	0	2	2	78	53	------	------	----	--
00	--------	90	Cu.	50	Cir.	0	--	----	0	----	0	3	1	85	62	------	------	----	--
100	Cu. St.	30	Cu.	00	--------	----	0	S W	12	----	--	1	3	85	57	------	------	----	--
00	--------	40	Cu.	10	Cir.	W	2	W	8	----	0	2	1	82	57	------	------	----	--
00	--------	60	Cu.	100	Cu. St.	S W	2	W	12	----	0	5	2	86	60	Ni	ght.	.05	--
30	Cir. St.	50	Cu.	00	--------	----	0	W	7	----	0	3	1	87	50	------	------	----	--
00	----- --	00	--------	00	--------	W	1	N	2	----	0	3	1	85	53	------	------	----	--
00	--------	00	--------	00	--------	0	--	W	3	----	0	2	2	90	53	------	------	----	--
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	------	2.19	--
45	--------	42	--------	22	--------	----	--	----	--	----	--	2.90	2.13	86°.84	58°.06	------	------	----	--

36

METEOROLOGICAL OBSERVATIONS FOR

Day of Month.	Thermometer, in Open Air.				Pressure of Vapor, in inches.			Relative Humidity, or Percentage of Saturation.			Barometer, Reduced to Freezing Point.			
	7 A. M.	2 P. M.	9 P. M.	Daily Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.
1	73	92	74	79⅔	.581	.476	.532	72	32	63	29.148	29.116	29.127	29.130
2	77	91	66	78	.639	.529	.639	69	36	100	29.112	29.069	29.073	29.051
3	69	77	70	72	.671	.601	.695	95	65	95	29.120	29.096	29.075	29.097
4	68	83	68	73	.685	.639	.612	100	69	90	29.033	28.996	28.982	29.004
5	74	85	72	77	.680	.691	.631	81	57	81	28.970	28.974	28.995	28.980
6	64	85	65	71⅓	.497	.420	.516	83	35	84	28.997	28.945	28.967	28.970
7	71	87	64	74	572	.429	.373	76	33	62	28.920	28.865	28.980	28.922
8	55	72	55	60⅔	.243	.411	.321	56	60	74	29.087	29.126	29.152	29.122
9	48	70	57	58⅓	.310	.426	.350	92	82	75	29.204	29.168	29.168	29.180
10	62	72	67	67	.340	.455	.489	61	58	75	29.133	29.061	29.051	29.082
11	67	86	69	74	.522	.719	.496	79	58	70	29.087	29.094	29.122	29.101
12	70	76	67	71	.482	.505	.556	66	56	84	29.098	29.065	29.066	29.076
13	65	75	61	67	.618	.554	.537	100	64	100	29.018	29.027	28.943	28.996
14	59	70	60	63	.500	.621	.518	100	85	100	28.982	28.986	29.068	29.012
15	57	65	54	58⅔	.407	.330	.282	87	53	67	29.129	29.142	29.160	29.144
16	55	70	50	58⅓	.295	.482	.309	68	66	85	29.148	29.039	29.089	29.092
17	59	72	52	61	.410	.595	.334	82	76	86	29.118	29.077	29.107	29.101
18	52	78	60	63⅓	.361	.310	.367	93	32	71	29.150	29.113	29.119	29.127
19	59	76	61	65⅓	.439	.369	.442	88	41	83	29.195	29.158	29.134	29.162
20	65	82	72	73	.483	.572	.524	78	52	66	29.137	29.074	29.050	29.087
21	67	89	75	77	.556	.678	.554	84	50	64	29.073	28.947	28.932	28.984
22	76	87	63	75⅓	.652	.504	.510	73	39	88	29.122	28.875	28.885	28.961
23	64	87	67	72⅔	.529	.504	.425	89	39	64	28.895	28.884	28.907	28.895
24	64	77	62	67⅔	.529	.356	.399	89	38	72	28.907	28.917	28.927	28.917
25	67	73	55	65	.425	.409	.349	64	50	81	29.011	29.018	29.153	29.061
26	54	78	64	65⅓	.418	.409	.464	100	43	77	29.163	29.149	29.108	29.140
27	70	84	70	74⅔	.482	.545	.551	66	47	75	29.145	29.155	29.189	29.163
28	68	91	74	77⅔	.577	.489	.463	85	34	56	29.179	29.139	29.220	29.179
29	65	94	73	77⅓	.549	.569	.581	89	36	72	29.196	29.176	29.148	29.173
30	63	94	71	76	.543	.488	.537	94	31	71	29.135	29.066	29.147	29.116
31	64	95	70	76⅓	.497	.475	.524	83	29	66	29.127	29.039	29.055	29.074
Sums.	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	------
Means	------	------	------	70°	.500	.502	.480	82	50	77	--------	--------	--------	29.100
Average					.494			70			--------			

THE MONTH OF AUGUST, 1879.

CLOUDS.						WINDS.						OZONE.		REGISTERING THERMOM'R.		RAIN AND SNOW.			
7 A. M.		2 P. M.		9 P. M.		7 A. M.		2 P. M.		9 P. M.									
Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Direction.	Force.	Direction.	Force.	Direction.	Force.	Day: 7 A. M. to 2 P. M.	Night: 9 P. M. to 7 A. M.	Maximum.	Minimum.	Beginning Rain or Snow.	Ending Rain or Snow.	Inches of Rain and Melt'd Snow.	Depth of Snow.
00	--------	10	Cu.	00	--------	S	1	S W	8	----	0	3	2	93	56	------	------	----	--
40	Cir. St.	50	Cir. Cu.	100	Nim.	S W	6	S W	9	S E	2	3	0	93	62	8:30 P. M.	------	----	--
100	Cu. St.	100	Cu.	50	Cir.	E	2	N	2	----	0	4	3	78	64	------	7 A. M.	.33	--
100	Fog.	00	--------	20	Cir.	S W	1	W	5	----	0	3	1	85	60	------	------	----	--
100	Cir. St.	90	Cir. St.	100	Cir. St.	S W	3	S W	7	----	0	3	1	87	50	------	------	----	--
20	Cir.	50	Cir. St.	50	Cir.	N W	1	S	5	----	0	2	1	86	53	------	------	----	--
00	--------	20	Cu.	60	--------	----	0	W	7	N	1	4	2	87	42	------	------	----	--
00	--------	90	Cir.	00	--------	N W	4	N E	8	----	0	3	0	73	36	------	------	----	--
----	Smoke.	----	Smoke.	----	Smoke.	N	6	N W	7	----	0	5	2	71	42	------	------	----	--
90	Cir. Cu.	100	Cu. St.	00	--------	S W	3	S W	4	----	0	3	2	78	55	------	------	----	--
00	--------	30	Cir. Cu.	00	--------	S W	2	S W	7	----	0	3	2	87	62	------	------	----	--
100	Cir. St.	100	Cu.	50	Cir. St.	S W	5	S W	9	----	0	2	4	82	61	Night.	------	.23	--
100	Cu. St.	50	Cu. St.	00	--------	----	0	S W	8	----	0	5	2	78	52	3 P. M.	Night.	.60	--
00	--------	100	Cu. St.	100	Cu. St.	----	0	N	2	N E	1	4	3	75	53	3 P. M.	6 P. M.	.45	--
100	Cu. St.	50	Cu. St.	100	St.	E	2	N	4	N E	2	3	2	68	39	------	------	----	--
20	Cu.	00	--------	00	--------	N E	4	N E	2	----	0	2	3	73	34	------	------	----	--
00	--------	00	--------	00	--------	N	2	N E	2	----	0	2	1	73	39	------	------	----	--
100	Fog.	00	--------	00	--------	----	0	----	0	----	0	1	2	73	45	------	------	----	--
100	Cu. St.	70	Cir. Cu.	00	--------	----	0	S W	4	----	0	2	5	78	54	------	------	----	--
00	--------	10	Cu.	00	--------	S	2	S W	6	S	4	2	1	85	57	------	------	----	--
100	Cu. St.	60	Cu.	00	--------	----	0	S W	8	S W	4	3	4	89	65	------	------	----	--
00	--------	00	--------	00	--------	S W	8	S W	6	----	0	2	3	87	57	------	------	----	--
00	--------	70	Cir.	00	--------	----	0	S W	11	N	4	3	2	78	48	------	------	----	--
30	Cir.	90	Cir. St.	00	--------	----	0	S W	2	N	1	3	3	74	39	------	------	----	--
60	Cir.	40	Cir. Cu.	60	St.	N E	4	N	8	----	1	3	0	76	49	------	------	----	--
40	St.	10	St.	00	--------	----	0	N	2	----	0	1	1	81	52	------	------	----	--
50	Cir. Cu.	00	--------	00	--------	S W	2	S W	2	----	0	1	2	86	66	------	------	----	--
10	Cir.	20	Cir. Cu.	30	Cir. Cu.	S W	2	S W	5	----	0	2	0	90	60	------	------	----	--
50	Cir. Cu.	00	--------	10	Cir. Cu.	W	4	N	8	----	0	1	0	95	55	------	------	----	--
----	Smoke.	----	Smoke.	30	St.	----	0	S W	5	----	0	1	0	95	54	------	------	----	--
----	Smoke.	----	Smoke.	----	Smoke.	----	0	S W	5	----	0	1	0	96	56	------	------	----	--
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	------	1.61	--
42	--------	39	--------	23	--------	----	--	----	--	----	--	2.58	1.76	82°.26	52°.16	------	------	----	--
		35																	

METEOROLOGICAL OBSERVATIONS FOR

DAY OF MONTH.	THERMOMETER, IN OPEN AIR.				PRESSURE OF VAPOR, IN INCHES.			RELATIVE HUMIDITY, OR PERCENTAGE OF SATURATION.			BAROMETER, REDUCED TO FREEZING POINT.			
	7 A. M.	2 P. M.	9 P. M.	Daily Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.
1	62	84	62	69⅓	.523	.652	.556	94	73	100	28.997	28.964	28.975	28.979
2	62	65	65	64	.556	.618	.618	100	100	100	29.010	28.950	28.888	28.949
3	66	66	61	64⅓	.639	.639	.537	100	100	100	28.691	28.608	28.744	28.843
4	61	67	51	59⅔	.413	.333	.348	77	50	93	28.949	28.994	29.122	29.022
5	58	70	56	61⅓	.365	.323	.363	76	44	81	29.189	29.145	29.125	29.153
6	63	66	51	60	.446	.316	.321	77	49	86	29.033	29.072	29.114	29.073
7	56	67	49	57⅓	.363	.333	.297	81	50	85	29.013	28.932	28.995	28.947
8	51	60	45	52	.321	.283	.251	86	54	84	29.113	29.166	29.232	29.170
9	46	58	42	48⅔	.238	.309	.244	77	64	91	29.327	29.282	29.327	29.312
10	43	67	48	52⅔	.254	.303	.310	92	46	92	29.419	29.386	29.389	29.398
11	47	72	60	59⅔	.298	.411	.338	92	60	65	29.417	29.339	29.256	29.337
12	62	63	52	59	.429	.543	.388	77	94	100	29.048	28.965	29.032	29.015
13	52	66	50	56	.361	.451	.335	93	73	93	29.019	28.948	29.046	29.004
14	46	59	45	50	.286	.296	.269	92	59	88	29.159	29.193	29.223	29.192
15	49	60	49	52⅔	.297	.310	.348	85	60	100	29.144	28.989	28.910	29.011
16	53	61	48	54	.375	.325	.335	93	61	100	28.946	28.873	28.843	28.887
17	47	63	54	54⅔	.298	.243	.308	92	42	74	29.029	29.095	29.081	29.068
18	49	60	46	51⅔	.348	.255	.238	100	49	77	29.146	29.165	29.269	29.193
19	42	59	48	49⅔	.278	.255	.260	100	53	78	29.381	29.352	29.392	29.375
20	41	59	42	47⅓	.235	.216	.244	91	45	91	29.449	29.437	29.420	29.435
21	47	65	48	53⅓	.273	.257	.285	85	43	85	29.439	29.340	29.289	29.356
22	39	61	55	51⅔	.216	.442	.405	91	83	94	29.220	29.143	29.133	29.165
23	54	68	55	59	.418	.349	.349	100	51	81	29.153	29.145	29.145	29.148
24	38	51	33	40⅔	.186	.196	.188	81	52	100	29.282	29.340	29.382	29.335
25	27	58	37	40⅔	.147	.153	.199	100	32	90	29.426	29.374	29.307	29.369
26	34	65	53	50⅔	.175	.216	.295	89	35	73	29.329	29.240	29.189	29.253
27	53	58	60	57	.348	.452	.242	86	94	48	29.148	29.090	29.088	29.109
28	67	74	68	69⅔	.522	.604	.476	79	73	69	29.092	29.058	29.068	29.073
29	64	78	68	70	.497	.550	.509	83	58	75	29.109	29.132	29.196	29.146
30	61	80	69	70	.442	.452	.564	83	44	79	29.276	29.244	29.244	29.255
------	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	-------
Sums.	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	-------
Means	------	------	------	56°.21	.352	.370	.347	88	60	86	--------	--------	--------	29.152
Average------------------------					.356			78			------------------------------------			

THE MONTH OF SEPTEMBER, 1879.

CLOUDS.						WINDS.						OZONE.		REGISTERING THERMOM'R.		RAIN AND SNOW.			
7 A. M.		2 P. M.		9 P. M.		7 A. M.		2 P. M.		9 P. M.									
Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Direction.	Force.	Direction.	Force.	Direction.	Force.	Day: 7 A. M. to 2 P. M.	Night: 9 P. M. to 7 A. M.	Maximum.	Minimum.	Beginning Rain or Snow.	Ending Rain or Snow.	Inches of Rain and Melt'd Snow.	Depth of Snow.
Sm	oke.	100	St.	100	Nim.	----	0	W	2	----	0	1	0	85	59	4 P. M.	-----	----	---
100	Nim.	100	Nim.	100	Cu. St.	----	0	N E	2	N E	3	5	0	66	62	------	-----	----	---
100	Nim.	100	Nim.	100	Cu. St.	N E	2	N E	8	N W	10	3	5	67	57	------	9 P.M.	2.18	---
00	--------	60	Cu.	00	--------	N W	8	W	4	----	0	3	2	70	37	------	-----	----	---
00	--------	50	Cir.Cu.	00	--------	N W	1	N W	3	----	0	2	4	70	52	------	-----	----	---
40	Cu.	50	Cu.	00	--------	W	2	W	12	----	0	3	4	71	44	------	-----	----	---
100	St.	90	Cu.	00	--------	S	1	S W	6	S W	4	3	4	68	45	------	-----	----	---
00	--------	40	Cir.Cu.	00	--------	N W	6	N W	6	N W	2	3	2	62	34	------	-----	----	---
100	St.	70	Cir.Cu.	00	--------	N	1	N E	1	----	0	2	0	60	30	------	-----	----	---
00	--------	00	--------	00	--------	----	0	S	3	----	0	3	2	67	38	------	-----	----	---
00	--------	50	Cir. St.	50	Cir. St.	----	0	S W	6	S E	6	3	5	72	47	------	-----	----	---
90	Cir.Cu.	100	Nim.	00	--------	S	6	S W	4	----	0	3	2	66	43	9 A. M.	3 P.M.	.22	---
00	--------	40	Cir.Cu.	100	St.	W	1	N E	2	N W	6	2	3	68	42	In Night.	-----	.11	---
90	Cu.	20	Cu.	00	--------	N	4	N E	3	----	0	2	4	60	40	------	-----	----	---
100	Cir. St.	100	Cu. St.	100	Nim.	S E	3	S	10	----	0	3	2	63	40	6 P. .M	10 P. M.	.20	---
50	Cir.	100	Nim.	00	--------	----	0	S W	3	----	0	2	5	63	41	3 P. M.	8 P.M.	.33	---
00	--------	30	Cir.	100	St.	W	2	N W	14	N W	2	3	5	63	46	Night	-----	----	---
100	Nim.	30	Cu.	00	--------	S W	1	N W	6	----	0	4	1	60	31	------	8 A.M.	.09	---
50	Cu.	60	Cu.	90	Cir.	----	0	N W	6	----	0	3	1	60	32	------	-----	----	---
00	--------	50	Cu.	00	--------	----	0	N W	3	----	0	2	2	62	31	------	-----	----	---
00	--------	00	--------	30	Cir.	----	0	S E	4	----	0	3	2	65	35	------	-----	----	---
40	Cir.Cu.	100	St.	30	Cir.	----	0	----	0	----	0	3	2	64	38	------	-----	----	---
00	--------	90	Cir.Cu.	100	St.	----	0	W	2	----	0	3	3	69	38	------	-----	----	---
80	Cu.	30	Cu.	00	--------	N W	12	N W	16	----	0	3	0	52	27	------	-----	----	---
00	--------	00	--------	00	--------	----	0	S W	6	----	0	4	2	59	27	------	-----	----	---
00	--------	00	--------	90	Cir.Cu.	----	0	S W	8	S E	6	3	3	65	34	Shower.	-----	.02	---
100	St.	100	St.	100	St.	S E	4	S E	5	S E	4	4	3	67	50	------	-----	----	---
100	Cir.	90	Cir.	100	Cir. St.	S W	5	S W	3	S	10	3	4	75	59	Shower.	-----	.04	---
90	Cir. St.	80	Cu.	60	Cir. St.	S W	6	S W	10	S	6	2	2	79	56	------	-----	----	---
10	Cir. St.	30	Cir.	00	--------	S W	1	S W	10	S	3	3	2	81	61	------	-----	----	---
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	-----	----	---
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	-----	----	---
45	--------	54	--------	42	--------	----	--	----	--	----	--	2.87	2.53	66°.66	42°.53	------	-----	3.19	---

47

METEOROLOGICAL OBSERVATIONS FOR

Day of Month.	Thermometer, in Open Air.				Pressure of Vapor, in Inches.			Relative Humidity, or Percentage of Saturation.			Barometer, Reduced to Freezing Point.			
	7 A. M.	2 P M.	9 P. M.	Daily Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.
1	69	84	68	73⅔	.529	.470	.509	75	40	75	29.316	29.250	29.255	29.274
2	73	81	61	71⅔	.409	.691	.537	50	63	100	29.198	29.081	29.200	29.160
3	54	66	47	55⅔	.362	.346	.310	87	54	92	29.289	29.272	29.273	29.278
4	44	74	61	59⅔	.265	.272	.354	92	32	66	29.282	29.201	29.129	29.204
5	66	83	68	71⅓	.502	.597	.583	78	56	94	29.205	29.094	29.122	29.140
6	61	85	69	71⅔	.537	.493	.529	100	41	75	29.196	29.177	29.187	29.187
7	61	86	73	73⅓	.505	.470	.617	94	40	77	29.188	29.135	29.137	29.153
8	65	69	67	67	.618	.671	.662	100	95	100	29.136	29.058	29.084	29.077
9	66	81	70	72⅓	.639	.704	.658	100	66	90	29.166	29.123	29.142	29.144
10	68	83	69	73⅓	.648	.787	.671	95	74	95	29.184	29.163	29.197	29.181
11	67	83	68	72⅔	.626	.677	.612	95	60	90	29.285	28.223	29.200	29.236
12	71	83	68	74	.644	.691	.612	86	63	90	29.245	29.213	29.272	29.243
13	59	67	66	66	.500	.626	.639	100	95	100	29.279	28.279	29.272	29.277
14	62	67	63	66	.556	.604	.576	100	94	100	29.300	29.265	29.263	29.276
15	62	77	63	67⅓	.537	.678	.576	100	73	100	29.286	29.220	29.206	29.237
16	62	77	69	69⅓	.556	.601	.564	100	65	79	29.212	29.107	29.023	29.114
17	66	72	66	68	.570	.455	.583	89	58	94	28.787	28.880	28.911	28.859
18	51	54	43	49⅓	.348	.308	.186	93	74	67	28.977	29.050	29.307	29.111
19	43	53	37	44⅓	.186	.194	.199	67	48	90	29.454	29.452	29.412	29.439
20	30	61	46	45⅔	.148	.325	.238	89	61	77	29.369	29.253	29.214	29.279
21	36	62	47	48⅓	.191	.284	.298	90	51	92	29.162	29.105	29.103	29.123
22	50	63	48	53⅔	.335	.327	.310	93	57	92	29.099	28.989	29.003	29.030
23	40	41	33	38	.203	.190	.150	82	74	80	29.200	29.320	29.433	29.318
24	30	39	25	31⅓	.167	.110	.135	100	46	100	29.547	29.567	29.637	29.584
25	26	48	38	37⅓	.141	.120	.103	100	36	45	29.706	29.654	29.625	29.652
26	39	55	43	45⅔	.131	.155	.164	55	34	59	29.550	29.403	29.357	29.437
27	39	58	53	50	.216	.203	.194	91	42	48	29.200	29.029	28.737	28.989
28	43	48	42	44⅓	.231	.131	.222	83	29	83	28.684	28.817	28.856	28.786
29	44	49	44	45⅔	.173	.152	.275	60	44	92	28.628	28.679	28.784	28.697
30	39	44	33	38⅔	.173	.151	.168	73	52	89	29.022	29.097	29.214	29.111
31	30	34	27	30⅓	.130	.120	.111	78	61	75	29.331	29.333	29.409	29.358
Sums	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	------
Means	------	------	------	57°.28	.379	.407	.398	87	57	84	--------	--------	--------	29.160
Average						.395			76		------------------------------			

THE MONTH OF OCTOBER, 1879.

CLOUDS.						WINDS.						OZONE.		REGISTERING THERMOM'R.		RAIN AND SNOW.			
7 A. M.		2 P. M.		9 P. M.		7 A. M.		2 P. M.		9 P. M.		Day: 7 A. M. to 2 P. M.	Night: 9 P. M. to 7 A. M.	Maximum.	Minimum.	Beginning Rain or Snow.	Ending Rain or Snow.	Inches of Rain and Melt'd Snow.	Depth of Snow.
Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Direction.	Force.	Direction.	Force.	Direction.	Force.								
100	Cu. St.	90	Cu.	00	--------	----	0	S W	4	----	0	3	2	85	57	------	------	----	--
70	Cir. Cu.	90	Cu.	60	Cir. St.	S	6	S W	12	----	0	4	3	84	49	9:15 A. M.	6 P. M.	.47	--
100	St.	100	Cir. St.	00	--------	S W	1	S W	4	----	0	4	1	67	35	------	------	----	--
00	--------	20	Cir. Cu.	70	Cu.	----	0	S W	6	S	1	4	4	74	44	------	------	----	--
90	Cu.	40	Cu.	00	--------	----	0	S W	3	----	0	3	0	85	60	------	------	----	--
00	--------	10	Cu.	00	--------	----	0	S W	7	----	0	3	3	87	60	------	------	----	--
00	--------	30	Cir. St.	100	St.	----	0	S	6	S E	1	3	4	86	61	10 P. M.	------	----	--
100	Nim.	100	Nim.	100	Nim.	S E	4	S	6	----	0	5	2	73	65	------	10:30 P. M.	.50	--
100	St.	40	Cu.	00	--------	----	0	----	0	----	0	4	1	81	64	------	------	----	--
90	Cu.	20	Cu.	00	--------	----	0	S W	4	----	0	4	2	83	67	------	------	----	--
100	St.	90	Cu.	00	--------	N E	2	S	2	----	0	4	2	84	64	------	------	----	--
70	Cu.	75	Cu.	00	--------	----	0	N E	2	N	3	3	3	85	59	------	------	----	--
100	St.	100	Nim.	100	St.	N E	4	----	0	----	0	2	4	68	60	2 P. M.	7 P. M.	.36	--
100	St.	100	St.	100	St.	----	0	S W	3	----	0	3	2	67	60	------	------	----	--
100	St.	10	Cu.	00	--------	----	0	----	0	----	0	2	1	76	58	------	------	----	--
90	Cir. Cu.	100	Cir. St.	100	St.	----	0	S E	2	E	1	4	3	80	62	------	-----	----	--
100	Nim.	50	Cu.	00	--------	S	1	S W	9	W	7	4	3	72	50	------	------	----	--
100	St.	100	Cu. St.	100	Cu. St.	W	7	N W	6	N W	8	3	5	55	36	------	------	----	--
00	--------	10	Cir. St.	00	--------	N W	3	N	3	----	0	3	1	54	29	------	------	----	--
00	--------	00	--------	00	--------	----	0	S W	4	----	0	3	2	62	30	------	------	----	--
90	Cir. St.	30	Cir. Cu.	20	Cir.	----	0	S W	5	----	0	2	3	62	36	------	------	----	--
00	--------	50	Cu.	100	Nim.	S W	2	S W	12	W	18	3	5	63	40	------	------	----	--
100	Cu. St.	100	Cu.	00	--------	N W	12	N W	12	N W	7	5	4	46	28	Hail	Storm	.06	--
90	Cu. St.	80	Cu.	00	--------	N W	3	N W	6	----	0	4	2	40	23	------	-----	----	--
00	--------	00	--------	00	--------	----	0	S	5	S E	5	3	4	48	26	------	------	----	--
00	--------	00	--------	50	Cir.	S	2	S W	8	S W	3	2	3	55	39	------	------	----	--
70	Cir. St.	95	Cir. St.	100	Cir. St.	S W	2	S W	10	S W	10	3	4	59	39	In Ni	ght.	.18	--
100	Cu.	100	Cu.	100	Cir. Cu.	W	7	W	15	W	1	3	4	49	41	------	------	----	--
5	Cir. St.	90	Cir. Cu.	30	Cu.	S W	6	N W	18	N W	8	2	3	57	39	------	------	----	--
100	Cu.	50	Cu.	90	Cir. Cu.	N W	8	N W	12	N W	6	4	4	46	28	------	------	----	--
90	Cu.	100	Cu.	90	Cu.	----	0	N W	13	N W	5	4	3	36	15	------	------	----	--
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	------	1.57	--
66	--------	61	--------	39	--------	----	--	----	--	----	--	3.32	2.81	66°.74	45°.94	------	------	----	--
		55																	

METEOROLOGICAL OBSERVATIONS FOR

DAY OF MONTH.	THERMOMETER, IN OPEN AIR.				PRESSURE OF VAPOR, IN INCHES.			RELATIVE HUMIDITY, OR PERCENTAGE OF SATURATION.			BAROMETER, REDUCED TO FREEZING POINT.			
	7 A. M.	2 P. M.	9 P. M.	Daily Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.
1	25	34	28	29	.100	.083	.106	75	43	90	29.375	29.323	29.267	29.322
2	28	32	27	29	.117	.143	.129	77	79	88	29.059	28.913	29.029	29.000
3	17	30	25	24	.078	.130	.117	83	78	87	29.244	29.251	29.260	29.252
4	20	30	27	25⅔	.091	.111	.111	85	68	76	29.307	29.301	29.324	29.311
5	27	29	30	28⅔	.093	.142	.148	64	89	89	29.264	29.080	29.063	29.136
6	30	52	40	40⅔	.148	.208	.182	89	54	73	29.115	29.067	29.063	29.082
7	47	59	56	54	.273	.352	.363	85	70	81	29.010	28.912	28.957	28.960
8	58	63	64	61⅔	.365	.416	.403	76	72	68	28.972	28.877	28.770	28.873
9	57	49	42	49⅓	.378	.272	.199	81	78	74	28.830	28.947	29.169	28.982
10	33	52	47	44	.168	.232	.225	89	60	70	29.351	29.275	29.110	29.245
11	50	68	64	60⅔	.361	.543	.529	106	79	89	28.908	28.787	28.850	28.848
12	58	62	52	57⅔	.452	.386	.308	94	67	79	28.745	28.602	28.825	28.724
13	48	70	61	59⅔	.310	.385	.325	93	53	61	28.925	28.859	28.802	28.862
14	63	61	51	58⅓	.510	.383	.296	89	71	79	28.617	28.547	28.609	28.591
15	45	57	46	49⅓	.251	.242	.215	84	52	69	28.609	28.609	28.710	28.643
16	42	42	36	40	.177	.177	.170	66	66	80	28.943	29.133	29.247	29.108
17	35	37	33	35	.183	.165	.168	90	81	89	29.331	29.281	29.293	29.302
18	27	39	32	32⅔	.111	.110	.125	76	46	69	29.338	29.323	29.209	29.290
19	33	37	28	32⅔	.168	.199	.099	89	90	66	28.773	28.660	28.825	28.753
20	18	21	17	18⅔	.067	.064	.063	68	57	67	29.120	29.167	29.216	29.168
21	20	24	22	22	.075	.094	.084	70	74	72	29.233	29.178	29.163	29.191
22	22	31	36	29⅔	.084	.155	.170	72	89	80	28.945	28.712	28.575	28.744
23	25	27	20	24	.082	.111	.075	62	76	70	28.816	29.095	29.290	29.067
24	20	35	35	30	.075	.108	.142	70	53	70	29.278	28.977	28.823	29.026
25	32	37	29	32⅔	.143	.116	.142	79	53	89	28.970	29.132	29.264	29.122
26	22	33	34	29⅔	.101	.168	.155	86	89	79	29.361	29.203	29.075	29.213
27	48	51	52	50⅓	.285	.348	.361	85	93	93	28.922	28.800	28.833	28.852
28	54	50	32	45⅓	.390	.258	.125	93	72	69	28.494	28.417	28.811	28.574
29	27	28	22	25⅔	.093	.099	.101	64	66	86	29.071	29.231	29.411	29.240
30	20	29	31	26⅔	.075	.087	.100	70	56	58	29.495	29.345	29.129	29.323
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Sums	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Means	------	------	------	38°.22	.193	.210	.191	80	69	77	------	------	------	29.027
Average					.198			75			------			

THE MONTH OF NOVEMBER, 1879.

CLOUDS. 7 A. M. Per Cent of Cloud.	CLOUDS. 7 A. M. Kind.	CLOUDS. 2 P. M. Per Cent of Cloud.	CLOUDS. 2 P. M. Kind.	CLOUDS. 9 P. M. Per Cent of Cloud.	CLOUDS. 9 P. M. Kind.	WINDS. 7 A. M. Direction.	WINDS. 7 A. M. Force.	WINDS. 2 P. M. Direction.	WINDS. 2 P. M. Force.	WINDS. 9 P. M. Direction.	WINDS. 9 P. M. Force.	OZONE. Day: 7 A. M. to 2 P. M.	OZONE. Night: 9 P. M. to 7 A. M.	REGISTERING THERMOM'R. Maximum.	REGISTERING THERMOM'R. Minimum.	RAIN AND SNOW. Beginning Rain or Snow.	RAIN AND SNOW. Ending Rain or Snow.	RAIN AND SNOW. Inches of Rain and Melt'd Snow.	RAIN AND SNOW. Depth of Snow.
75	Cir.Cu.	90	Cu.	50	Cir.	W	6	S W	12	S W	4	5	6	36	24	----	----	.04	½
100	Nim.	100	Nim.	50	Cir.Cu.	S E	5	N W	2	N	8	5	7	32	16	2:30 A. M.	1:30 P. M.	.08	1½
00	--------	90	Nim.	15	Cir.Cu.	N W	8	N W	8	N W	7	6	7	33	15	1:30 P. M.	5 P. M.	.01	3-10
90	Cu. St.	90	Cir.Cu.	00	--------	S E	2	W	8	S	4	6	5	32	19	----	----	----	------
100	St.	100	Nim.	100	St.	S E	10	S E	14	S E	6	4	6	30	26	8:40 A. M.	6:45 P. M.	.09	1 1-5
100	St.	00	--------	50	Cir.Cu.	S E	4	S	8	S	11	5	1	52	28	----	----	----	------
100	Cu. St.	100	Cu. St.	100	Cu. St.	S	12	S W	17	S W	7	0	3	60	46	----	----	----	------
100	Cu. St.	100	Nim.	50	Cu. St.	S	14	S	19	S	20	2	5	66	56	2 P. M.	2:15 P. M.	.29	------
100	Cu.	100	Nim.	00	--------	S W	19	W	22	W	10	4	4	57	31	----	----	----	------
90	Cir. Cu.	100	St.	100	St.	W	2	E	3	E	11	2	3	52	32	Ra	in.	.99	------
100	St.	100	Cu.	100	Nim.	S E	15	S W	26	S W	10	0	1	68	50	3 A. M.	9:05 P. M.	.39	------
100	Nim.	100	Cu.	00	--------	E	8	S W	17	W	14	0	5	67	46	3 A. M.	6 P. M.	.59	------
00	--------	00	--------	00	--------	S E	7	S W	13	S	11	2	4	75	47	Sho	w's.	.35	------
100	Nim.	100	Cu.	10	Cu.	S W	16	W	15	S W	9	4	6	63	44	5 A. M.	11 A. M.	.34	------
25	Cir.Cu.	75	Cir.Cu.	00	--------	W	3	S W	13	S W	12	4	6	60	41	4 P. M.	4:30 P. M.	.04	------
100	Cu.	90	Cu.	00	--------	W	21	W	20	W	4	5	4	44	33	----	----	----	------
100	St.	100	Cu.	50	Cu. St.	N E	3	N E	10	N E	15	0	3	38	31	----	----	----	------
90	Cir.Cu.	40	Cir.Cu.	5	Cir.Cu.	N W	14	N W	7	W	6	4	5	41	27	----	----	----	------
100	Cu.	100	Cu St.	100	Nim.	S W	22	S W	30	N W	23	6	7	38	16	----	----	----	------
5	Cu.	50	Cu.	00	--------	N W	24	N W	19	N W	16	6	7	24	13	----	----	----	------
75	Cir.Cu.	100	Nim.	50	Cir.Cu.	W	10	S W	8	S W	13	4	6	24	16	----	----	----	------
100	St.	100	Nim.	100	St.	S W	16	S W	21	S W	19	5	6	36	20	1:30 P. M.	----	.02	4-5
10	Nim.	50	Cu.	00	--------	W	18	N W	17	S W	6	5	6	28	15	----	----	----	------
90	Cir.Cu.	50	Cir.	50	Cir.	S W	11	S	22	S W	21	3	4	36	18	----	----	----	------
25	Cir.Cu.	25	Cu.	00	--------	W	19	W	20	W	3	4	1	38	19	----	----	----	------
100	Cir.Cu.	100	Cu. St.	100	St.	S E	10	S E	15	S E	9	0	6	48	21	2 P. M.	6 P. M.	.70	------
100	Cu. St.	100	Nim.	100	Nim.	S W	16	S W	21	S	9	5	0	54	47	10 A. M.	4 P. M.	.47	------
100	Nim.	90	Cu.	100	Cu.	S E	17	W	31	W	29	3	5	55	26	4 A. M.	9:20 A. M.	.15	------
75	Cir.Cu.	100	Nim.	100	--------	N W	21	N W	17	N W	9	5	5	30	17	----	----	----	------
75	Cir.Cu.	80	Cir. St.	100	Cir. St.	S E	6	S E	19	W	22	2	5	34	18	----	----	----	---- -
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	----	----	----	------
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	----	----	4.55	4 3-10
78	--------	81	--------	45	--------	----	--	----	--	----	--	3.53	4.63	45°.03	28°.6	----	----	----	------
		68																	

METEOROLOGICAL OBSERVATIONS FOR

DAY OF MONTH.	THERMOMETER, IN OPEN AIR.				PRESSURE OF VAPOR, IN INCHES.			RELATIVE HUMIDITY, OR PERCENTAGE OF SATURATION.			BAROMETER, REDUCED TO FREEZING POINT.			
	7 A. M.	2 P. M.	9 P. M.	Daily Mean.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.
1	33	48	40	40⅓	.168	.165	.160	89	49	65	29.051	29.032	29.055	29.006
2	40	46	42	42⅔	.160	.192	.249	65	62	91	28.906	28.875	28.950	28.910
3	35	35	33	34⅓	.183	.183	.168	90	90	89	28.943	28.915	29.061	28.973
4	33	37	36	35⅓	.168	.178	.191	89	81	90	29.286	29.211	29.251	29.269
5	40	52	56	49⅓	.225	.308	.308	91	79	69	29.050	28.827	28.682	28.853
6	52	45	39	45⅓	.334	.251	.195	86	84	82	28.479	28.469	28.610	28.519
7	35	35	31	33⅔	.162	.142	.118	80	70	69	28.696	28.819	29.011	28.842
8	31	33	30	31⅓	.136	.131	.130	79	70	78	29.153	29.201	29.302	29.219
9	32	38	47	39	.162	.208	.273	89	91	85	29.197	28.955	28.788	28.980
10	52	41	31	41⅓	.334	.190	.100	86	74	58	28.527	28.637	28.880	28.657
11	21	20	17	19⅓	.080	.091	.063	71	85	67	28.953	29.020	29.116	29.030
12	19	20	18	19	.071	.075	.067	69	70	68	29.214	20.278	29.365	29.286
13	13	29	22	21⅓	.078	.105	.101	100	67	86	29.452	29.385	29.322	29.386
14	26	31	30	29	.105	.155	.148	75	89	89	29.129	28.934	28.836	28.966
15	29	25	18	24	.123	.100	.082	78	75	84	28.723	28.815	28.951	28.830
16	15	29	19	18	.070	.091	.087	82	85	85	28.963	28.730	28.881	28.858
17	18	19	15	17⅓	.082	.071	.055	84	69	65	29.161	29.211	29.292	29.221
18	14	21	12	15⅔	.051	.064	.045	64	57	61	29.312	29.260	29.264	29.279
19	16	22	22	20	.074	.084	.101	83	72	86	29.266	29.128	29.068	29.154
20	22	24	15	20⅓	.101	.094	.070	86	74	82	29.075	29.168	29.305	29.183
21	8	14	14	12	.062	.067	.067	100	82	82	29.331	29.108	28.805	29.081
22	29	29	21	26⅓	.123	.123	.096	78	78	86	28.670	28.955	29.148	28.924
23	17	25	29	23⅔	.078	.100	.142	83	75	89	29.286	29.104	28.908	29.099
24	33	28	25	28⅔	.168	.135	.117	89	88	87	28.938	29.068	29.162	29.056
25	15	19	11	15	.070	.103	.057	82	100	80	29.162	29.061	29.106	29.110
26	4	9	9	7⅓	.038	.051	.051	74	78	78	29.121	29.204	29.161	29.162
27	20	31	30	27	.091	.100	.111	85	58	68	28.924	28.905	28.928	28.919
28	23	31	34	29⅓	.106	.136	.155	86	79	79	28.951	28·853	28.667	28.824
29	40	38	35	37⅔	.225	.186	.162	91	81	80	28.737	28.840	28.980	28.852
30	20	24	18	20⅔	.091	.094	.082	85	74	84	29.308	29.415	29.410	29.378
31	22	32	27	27	.101	.162	.111	86	89	76	29.057	29.078	29.259	29.131
Sums.	------	------	------	------	------	------	------	------	------	------	--------	--------	--------	-------
Means	------	------	------	27°46	.130	.133	.124	83	77	79	--------	--------	--------	29.032
Average.....................						.129			80		----------------------------------			

THE MONTH OF DECEMBER, 1879.

CLOUDS.						WINDS.						OZONE.		REGISTERING THERMOM'R.		RAIN AND SNOW.			
7 A. M.		2 P. M.		9 P. M.		7 A. M.		2 P. M.		9 P. M.									
Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Per Cent of Cloud.	Kind.	Direction.	Force.	Direction.	Force.	Direction.	Force.	Day: 7 A. M. to 2 P. M.	Night: 9 P. M. to 7 A. M.	Maximum.	Minimum.	Beginning Rain or Snow.	Ending Rain or Snow.	Inches of Rain and Melt'd Snow.	Depth of Snow.
00	--------	10	Cir.	90	Cir.	S W	16	S W	15	S W	7	4	2	49	32	------	----	----	----
100	Cu. St.	100	Cir. St.	100	Nim.	S	12	S W	7	S	5	4	0	46	34	5:10 P. M.	----	----	----
100	Nim.	100	Nim.	100	St.	N E	7	N E	3	N E	5	0	2	36	32	------	6 P. M.	.54	----
100	St.	100	Cu. St.	100	St.	N E	5	E	12	E	11	0	0	44	32	------	----	----	----
100	Cu. St.	90	Cir. Cu.	100	St.	S E	12	S E	18	S	23	0	0	56	40	In Ni	ght.	.18	----
100	Nim.	100	Cu.	100	Nim.	S E	16	S W	26	S W	19	4	5	52	35	5 A. M.	N't.	.37	----
100	Cu.	100	Cu.	100	Cu.	S W	19	W	25	W	9	5	3	37	30	------	----	----	----
100	St.	100	Cu.	100	Cu.	N E	5	N E	7	N E	7	0	1	32	30	------	----	----	----
100	St.	100	Nim.	100	Nim.	S E	15	S E	16	S E	17	0	1	58	31	7:30 A. M.	6 A. M.	1.54	----
100	Nim.	100	Cu.	90	Cu.	S W	15	W	29	W	27	3	6	57	19	7:05 A. M.	10 A. M.	.05	----
100	Cu. St.	80	Nim.	00	--------	W	31	W	20	W	9	6	7	22	14	7:30 A. M.	5 P. M.	.01	.03
100	Cu. St.	80	Cu.	50	Cir. Cu.	S W	10	S W	20	S W	12	5	6	20	12	------	----	----	----
00	--------	00	--------	00	--------	S W	8	S E	10	S E	9	0	3	30	12	------	----	----	----
100	St.	100	St.	50	St.	S E	4	S E	3	S E	1	0	5	34	21	Snow.	----	.01	.03
100	Nim.	100	Nim.	100	Nim.	S W	9	W	30	S W	12	6	5	30	9	3 A. M.	4:30 P. M.	.025	.07
90	St.	100	Nim.	00	--------	S W	13	S E	4	W	7	1	7	20	13	8:30 A. M.	4 P. M.	.20	.3½
85	Cir. Cu.	100	Cu.	90	Cir. Cu.	N W	8	N W	10	N W	12	7	7	21	11	------	----	----	----
80	Cir. Cu.	75	Cir. Cu.	100	Cu. St.	N W	11	W	9	W	4	5	4	23	12	------	----	----	----
100	Cu. St.	100	St.	100	St.	S E	4	S E	4	S E	3	1	8	21	14	------	----	----	----
100	Nim.	100	Cu. St.	50	Cir. Cu.	W	10	N E	4	N E	9	3	1	26	6	------	----	----	----
100	Cu. St.	100	St.	100	Nim.	N E	8	E	16	E	10	2	4	27	6	In Ni	ght.	.30	1.8
100	Cu. St.	50	Cu.	00	--------	W	32	W	26	S W	10	4	4	31	13	------	----	----	----
100	Cir. Cu.	100	Cu. St.	100	Nim.	N E	7	E	10	E	9	0	5	32	15	In Ni	ght.	.17	----
100	Nim.	100	Nim.	100	Nim.	N W	11	N W	18	W	5	6	3	32	14	------	----	----	----
100	St.	100	Cu. St.	80	Cir. Cu.	N W	3	S W	7	W	24	4	6	19	-3	------	----	----	----
50	Cu. St.	90	Cu.	90	Cir. Cu.	W	15	W	17	S W	10	7	6	18	2	------	----	----	----
50	Cir. Cu.	100	Cu. St.	75	Cir. St.	S W	19	S W	16	S	7	4	5	31	18	------	----	----	----
75	Cu. St.	100	St.	100	St.	S W	7	S E	9	S E	9	1	5	40	22	In Ni	ght.	.06	----
100	Nim.	100	St.	100	St.	W	10	N W	5	N W	3	5	0	39	20	------	----	----	----
75	Cu.	50	St.	100	St.	N	3	N E	6	E	5	0	3	25	17	In Ni	ght.	.05	.7
100	St.	100	Cu.	00	--------	S E	4	W	22	S W	12	5	6	29	18	7:40 A. M.	10 A. M.	.02	----
----	--------	----	--------	----	--------	----	--	----	--	----	--	----	----	------	------	------	----	3.555	6.13
87	--------	88	--------	76	--------	----	--	----	--	----	--	2.97	3.87	33°.45	18°.74	------	----	----	----
		84																	

ABSTRACT OF THE METEOROLOGICAL TABLES FOR 1879.*

MONTHS—1879.	Temperature in Open Air.	Pressure of Vapor.	Humidity.	Barometer Reduced to Freezing Point.	Clouds.	OZONE.		REGISTER. THERM.		Rain.	Snow.
						Day.	Night.	Max.	Min.		
January	19°.19	.094	89	29.130	68	4.00	4.48	26°.42	9°.94	.49	6¾
February	20°.40	.105	92	29.107	73	4.54	5.01	27°.64	9°.96	1.43	11
March	33°.19	.152	78	29.002	56	3.93	4.30	40°.86	23°.40	1.57	1¼
April	44°.84	.195	66	29.050	44	3.00	4.00	56°.93	31°.00	1.25	¾
May	58°.76	.321	64	29.116	40	2.79	2.68	72°.35	43°.77	2.45	......
June	66°.02	.478	75	29.073	43	2.43	2.03	78°.50	51°.10	2.87	......
July	74°.03	.573	71	29.057	36	2.90	2.13	86°.84	58°.06	2.19	......
August	70°.00	.494	70	29.100	35	2.58	1.76	82°.26	52°.16	1.61	......
September	56°.21	.356	78	29.052	47	2.87	2.53	66°.66	42°.53	3.19	......
October	57°.28	.395	76	29.160	55	3.32	2.81	66°.74	45°.14	1.57	......
November	38°.22	.198	75	29.027	68	3.53	4.63	45°.03	28°.60	4.55	4.30
December	27°.46	.129	80	29.032	84	2.97	3.87	33°.45	18°.74	3.55	6.13
Average	46°.88	.291	76	29.080	54	3.24	3.36	57°.64	34°.53	......	......
Sum	....	....	....	....	....	......	......	....	....	26.82	30.18

*For the observations for the months of November and December I am indebted to Dr. H. B. Baker, Secretary of the State Board of Health.

INDEX.

A.

PAGE.
Accounts of Secretary, 7–12
    Farm Department, 9
    Horticultural Department, 9
    Library, 10
    Chemical Department, 10
    Museum, 11
    Apiary, 11
    Mechanical Department, 11
Agriculture, State Board of, 3
Agricultural College Lands, 14
Adulteration of Food, 72
Address by Col. N. H. Vincent, 77
    G. D. Rose, 93
Apiary Report, 32
Agricultural Fairs, 149
Addresses given at more than one Institute, 182–251
Abbot, Pres. T. C., Lecture by, 182
Agriculture, Salt in, 261
Agricultural Capability of the Saginaw Valley, 275
Agricultural Societies, Association of 445

B.

Baird, R. G., Secretary, Lecture by, 203
Ball, Wm., On Improvement of Stock, 166
Best Breeds of Cattle, 104
Big Rapids Institute, 77–92
Boys on the the Farm, Address by L. G. Palmer, 78
Boys, Farmers', 203
Boys and Girls on the Farm, 73
Brain on the Farm, 81
Brown, Hon. M., Essay by, 81
    Brown, Wm. A., Essay by, 128
Beal, W. J., Lecture by, 188

C.

Cassidy, James, Essay by, 133
Care of Live Stock in Winter, 60
Cattle, Best Breeds of, 104
Carpenter, Prof. R. C., Lecture by, 209
Childs, Hon. J. Webster, Address by, 112
Circumstances, 165
Cook, Prof. A. J., on Honey Bee's Tongue, 252
    On the Study of the Working Bee, 258
    Division Board Feeder, 260

PAGE.

- College Accounts, 7–12
  - Lands, 14
- Corey, J. D., Essay by, 98
- Corn Culture, 142
  - Discussion, 147
- Coryell, Miss Eva D., Essay by, 172
- Cushman, Mrs. S., Essay by, 104
- County Societies, Reports of, 445
  - Bay, 462
  - Berrien, 465
  - Ingham, 466
  - Kalamazoo, 468
  - Saginaw, 474
  - Van Buren, 476

D.

- Department Accounts, 9
  - Farm, 9
  - Horticultural, 9
  - Library, 10
  - Reports of, 16–47
  - Of Horticulture, Report of, 42
- Division-board Feeder, 260
- Donations to College, 48–57
- Dockeray, R., Address by, 59
- Drainage of the Farm, 118
  - Discussion on, 124
- Drained Swamp Lands of Ingham Co., Condition of, 175

E.

- Economy in Farm Management, 227
- Education, by Prof. C. F. Field, 101
  - For Women, 172
- Experiments of the Horticultural Department, 188

F.

- Faculty Report, 19
- Farm Drainage, 118
- Farmers' Organizations, 112
- Farmer's Institutes, 58–251
  - Appointments for, 58
- Farm Insects, 92
- Farmer in Society, 94
- Farmers' Boys in Relation to Farming, 203
- Food, Adulteration of, 72
- Felker, Peter H., Address by, 27
- Frazer, John T., V. S., Lecture by, 60, 235
- Field, Prof. C. F., Essay on Education, 101
- Farming as an Occupation, 126
- Fairs, Agricultural, 149
- Fruit on the Farm, 150
  - Discussion on, 152
- Fertilizers, 160
- Farm Management, Economy in, 227

G.

- Gillette, J. H., Essay by, 160
- Gulley, F. A., Lecture by, 227

H.

- Hanscom, I. D., Address by, 111
- Hedge Fences, 98
- Home Influence (Essay), 104

PAGE.
Horticultural Department, Report of, 42
Horticulture, Progressive, 133
Howe, Chas. F., Essay by, 153
Horticultural Experiments, 188
Horse's Foot, The, 235
Hog, The, 281

I.

Injurious Insects, 68
Inventory, Summary of, 12
Institute at Rockford, 59–76
    Big Rapids, 77–92
    Manchester, 93–111
    Romeo, 111–127
    Buchanan, 127–163
    Mason, 164–181

J.

Jones, Morse W., Essay by, 281

K.

Kedzie, Dr. R. C., Lecture by, 261
Kedzie, Robert F. Lecture by, 245
Kidder, C. B., Essay by, 118
Kutz Mrs. M. J., Essay by, 73

L.

Labor of Students, 12
Lands, College, 14
Lectures Given at more than one Institute. 182–251
Library Report, 28

M.

Manchester Institute, 93–111
Mars, Thomas, Address by. 127
Mason Institute, 164–181
Manual Labor at the Michigan State Agricultural College, 182
Marston, Hon. Isaac, Lecture by, 275
Meteorological Observations, 481–506
Miscellaneous Papers, 225–290

O.

Our Patent System, 209

P.

Patent System, 209
Palmer D. W., Essay on Cattle by, 107
Palmer, L. G., Address by, 78
Polly and the Kettle, 85
President's Report, 16
Progressive Horticulture, 133

R.

Rawson, Geo. S., Essay by, 94
Report of President, 16
    Faculty, 19
    Prof. of English Literature, 26
    Librarian, 28
    Prof. of Zoölogy, etc., 31
    Apiarist, 32

PAGE.

Report of Prof. of Botany and Horticulture, ... 33
  Prof. of Agriculture, ... 34
  Prof. of Mathematics, etc., ... 40
  Horticultural Department, ... 42
  State Agricultural Society, ... 292
Reports of County Societies, ... 445
  Association of Agricultural Societies, ... 445
  Bay County, ... 462
  Berrien County, ... 465
  Ingham County, ... 466
  Kalamazoo County, ... 466
  Northern Michigan, ... 473
  Saginaw County, ... 474
    Farmers' Club, ... 475
  Stockbridge Union, ... 475
  Van Buren County, ... 476
  Western Michigan, ... 478
Rockford Institute, ... 59–76
Root Crops, Culture, Cost, and value of, ... 89
Rose, G. D., Address by, ... 93
Romeo Institute, ... 111–127
Roe, Dr. J. M., Essay by, ... 150

S.

Salt in Agriculture, ... 261
Saginaw Valley, Capability of the, ... 275
Secretary's Account, ... 7
Sheep, Essay and Discussion on, ... 125
Skeels, F. E., Essay by, ... 68
Small Fruit, Culture of, ... 128
  Varieties, ... 129
  Modes of Culture, ... 130
  Sparks, Levi, Essay by, ... 142
State Board of Agriculture, ... 3
Stock, Improvement of, ... 166
State Agricultural Society, Report of, ... 292
Student's Labor, ... 12
Sting of the Working Bee, ... 258
Summary of Inventory, ... 12
Supplementary Statement of Secretary, ... 13
Superphosphates for the Farm, ... 245

T.

The Horse's Foot, ... 235
Tongue of the Honey Bee, ... 252

U.

Upton, Mrs. J. A., Essay by, ... 85

V.

Vincent, Col. N. H., Address by, ... 77

W.

Warren, G. W., Essay by, ... 89
Wheat Culture, ... 153
Wintering Stock, ... 60
Wood, A. F., Address by, ... 164
Wood, Miss Nettie, Essay by, ... 165
Woodhouse, I. B., Lecture by, ... 175

New York Botanical Garden Library
3 5185 00259 1319